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TO MENTAL STATE

# D00030562

MANHATTAN DISTRICT HISTORY

Mary John

BOOK IV - PILE PROJECT

X-10

VOLUME 6 - OPERATION

APPENDIX - A PSZCO

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Exthering Branch OR E.

135-9

ORO 94377



THIS DECUMENT CONSISTS OF 28 TPAGES
NO 4 OF 4 COPIES. SERIES A

#### APPENDIX A

MAPS, DEALINES, PROZOS, AND RESCRIPTIONS



SV COV

	April 1
THE MATTHEW STEW	ROY DECLASSIFICATION REVIEW
ALTHORITY: BU	DETERMINATION (CIRCLE NUMBER(S))  1. GLASSIPICATION RETAINED  2. GLASSIPICATION CHANGED TO:  2. GANTAINS NO DOE CLASSIPIED INFO  4. GOORDINATE WITH:  5. CLASSIPIED INFO BRACKETED  7. OTHER (SPECIFY):
	7

CLASSIFICATION CANCELLED
OR CHANGED TOBY AUTHORITY OF DOE/DPC
JOHN K. VAHISOCK 9/C/79
REVIEWS BY DATE

P9236





#### MANHATTAN DISTRICT HISTORY

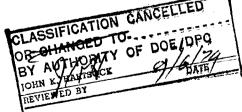
#### BOOK IV - XIO PROJECT

#### VOLUME 6 - OPERATION

#### APPENDIX A

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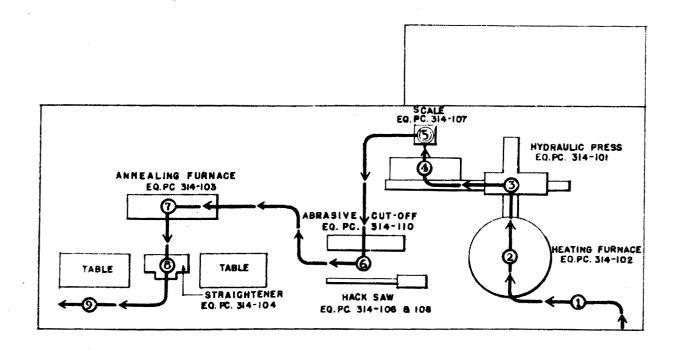
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	151	Photo - Richland Village Park



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# FLOW SHEET

BLDG. NO. 314 - ROD EXTRUSION



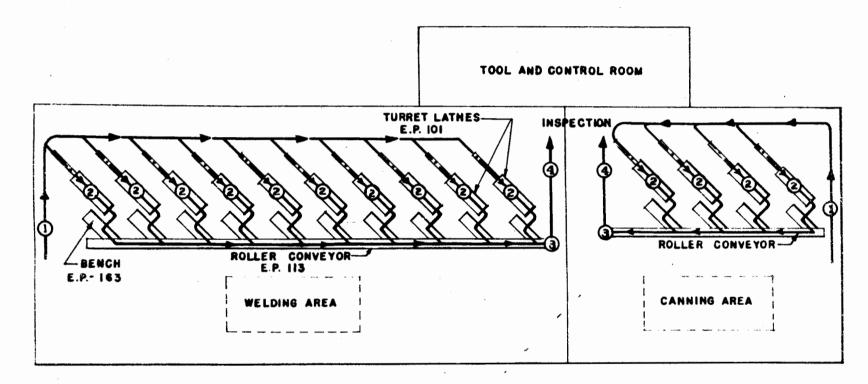
## LIST OF OPERATIONS

OPER. NO	NAME .	EQUIPMENT	E.P. HO.
1	TRANSFER	TRUCK	314
<b>②</b>	PRE-HEAT	FURNAGE	314-102
3	EXTRUDE	HYDRAULIG PRESS	314-101
4	STRAIGHTEN & QUENCH	TABLE & TANK	314-107
	WEIGH	SCALES	314-107
6	CROP	SAW	314-108, 8,10
①	ANNEAL & OUTGAS	FURNACE	314-103
<b>8</b>	STRAIGHTEN	STRAIGHTENING ROLLS	314-104
<b>(9)</b>	TRANSFER	TRUCK	314



# FLOW SHEET

BLDG. 313 - SLUG MACHINING



# LIST OF OPERATION

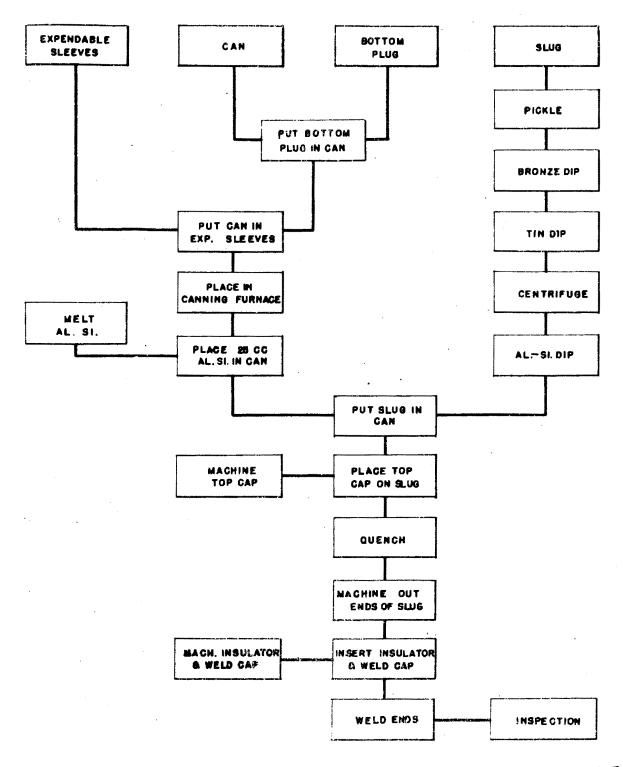
- 1 TRANSFER
- 2 MACHINE
- 3 TRANSFÉR
- 4 INSPECTION & TRANSFER

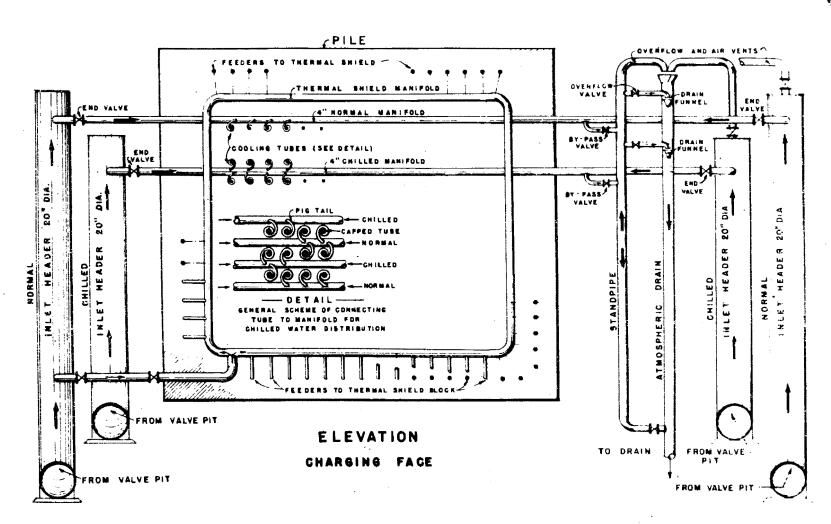


# 928

# FLOW SHEET

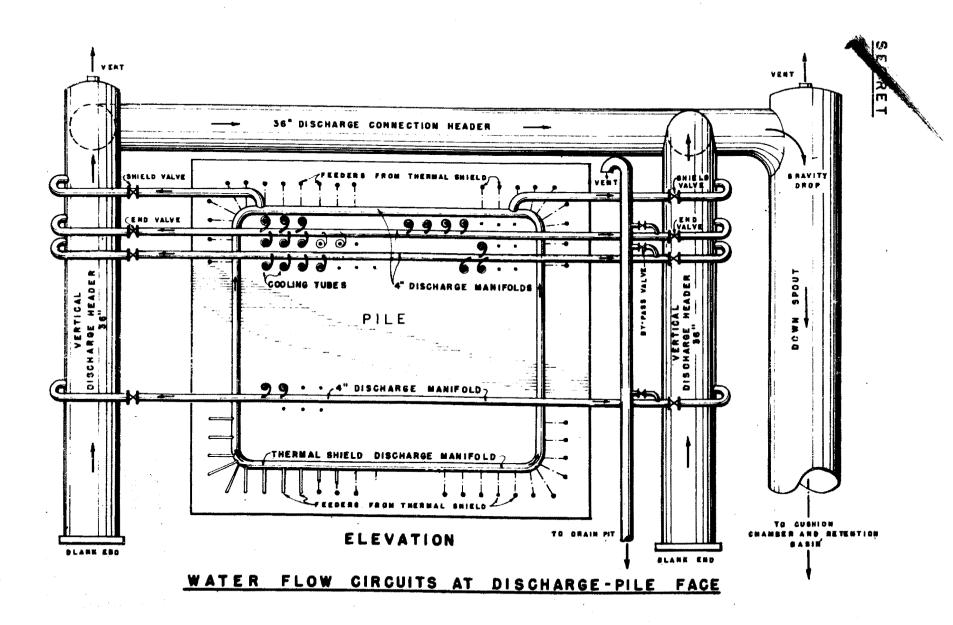
# ASSEMBLY OPERATION





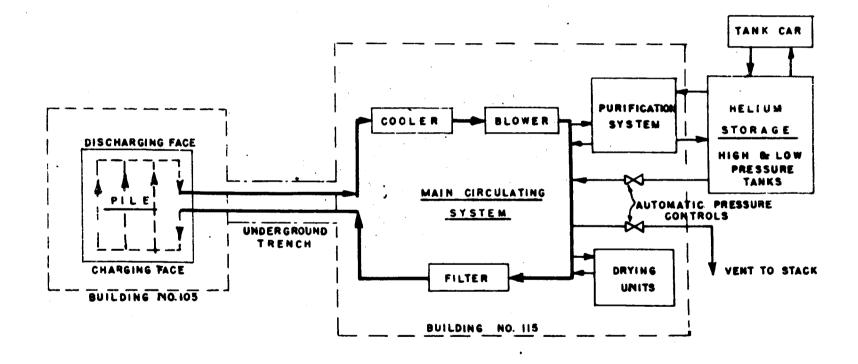
WATER FLOW CIRCUITS AT CHARGING - PILE FACE

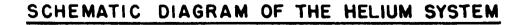
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SE SET

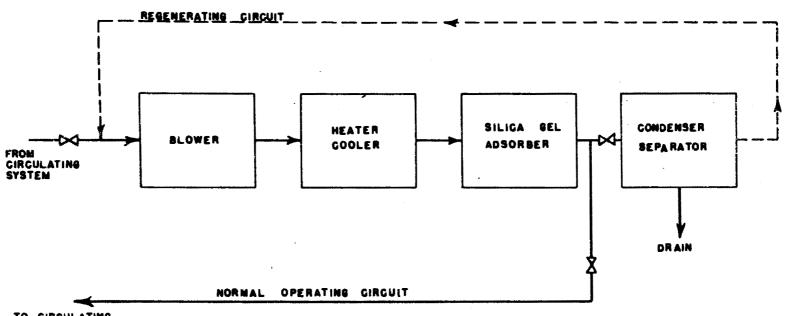
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# SET

# ARRANGEMENT OF DRYING UNIT

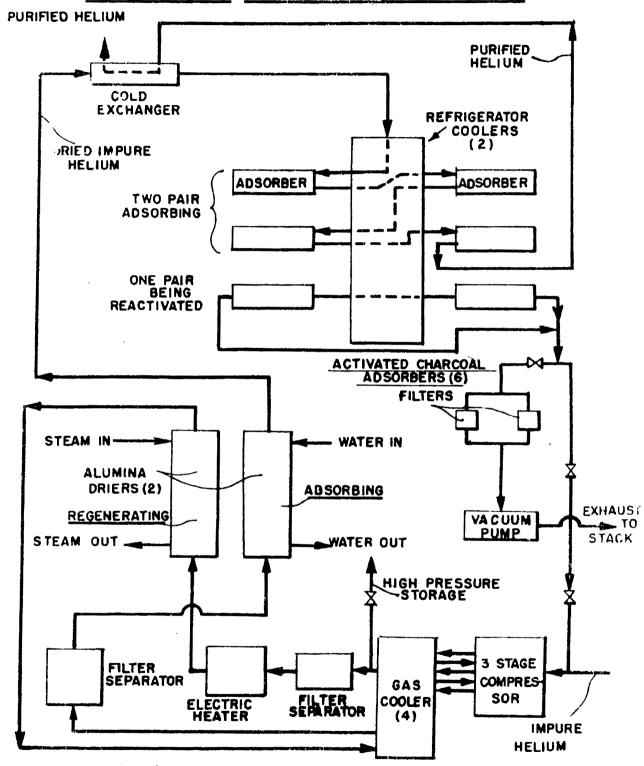


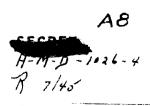
TO GIRCULATING SYSTEM

A7 7-M-B-1114-4



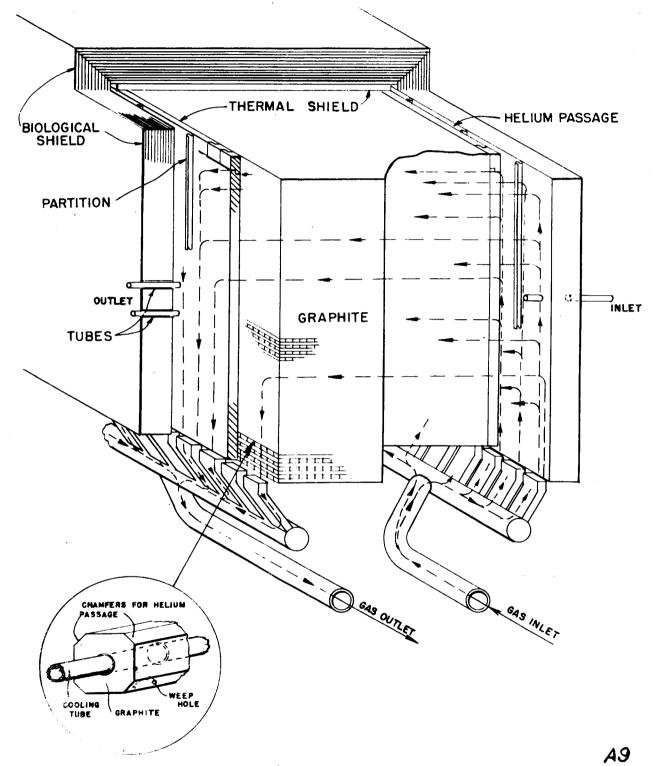
## FLOW CIRCUIT-HELIUM PURIFICATION UNIT







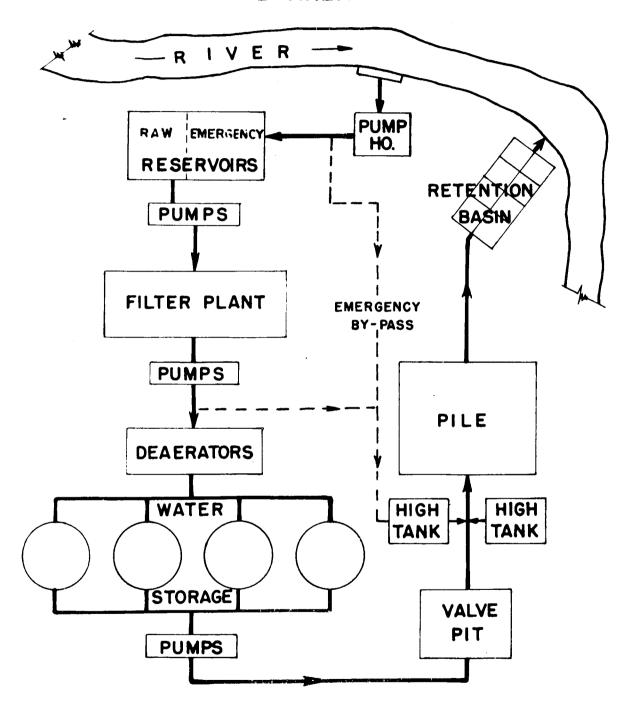
## HELIUM CIRCULATION THROUGH PILE

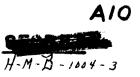


H-17-D-521-4

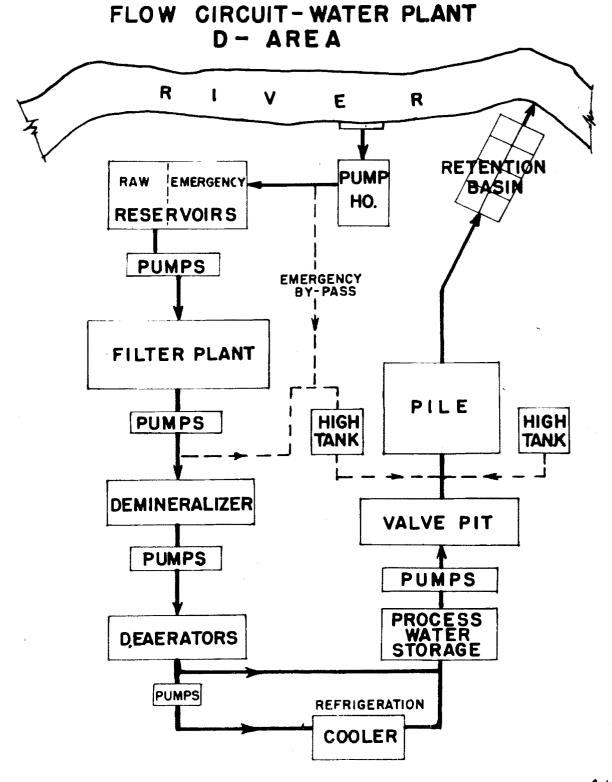


# FLOW CIRCUIT - WATER PLANT B-AREA



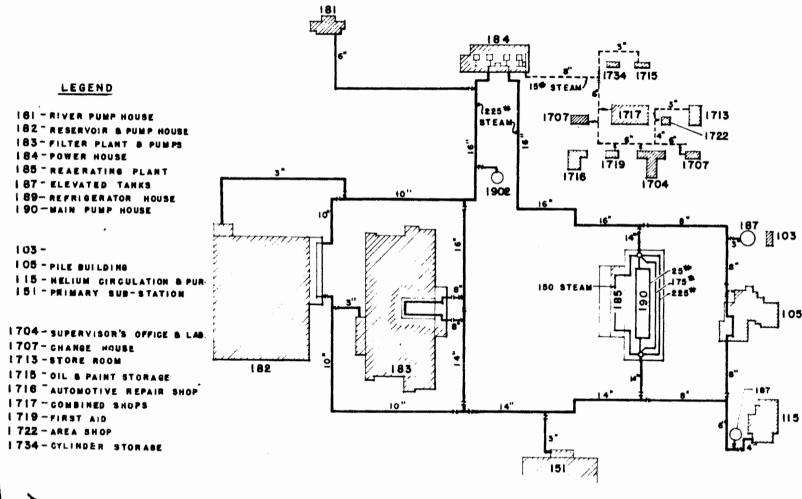






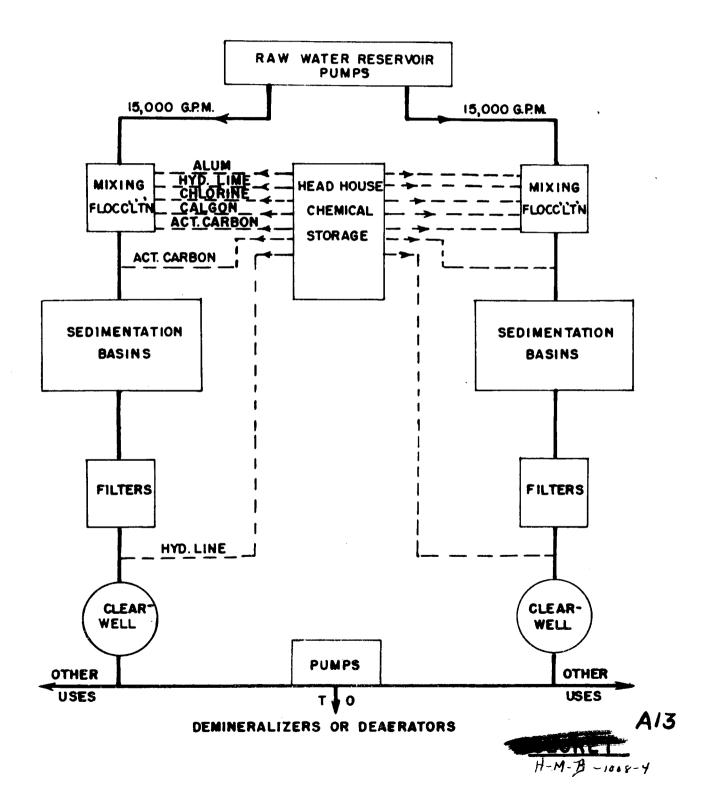


## 100 AREA STEAM LINES



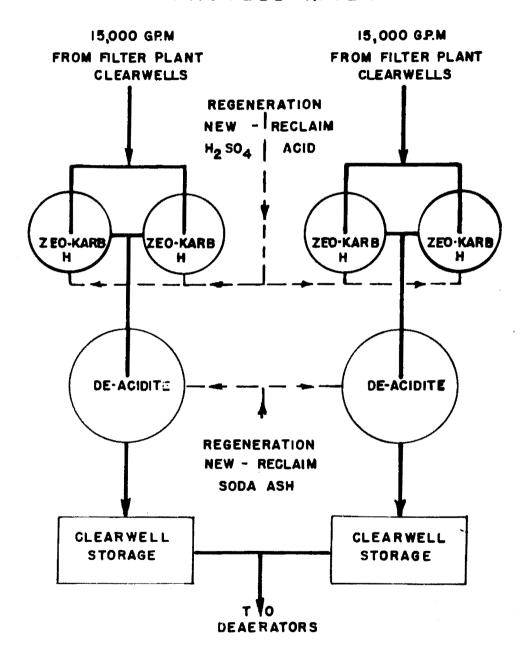


# FLOW CIRCUIT-FILTER PLANT PROCESS WATER





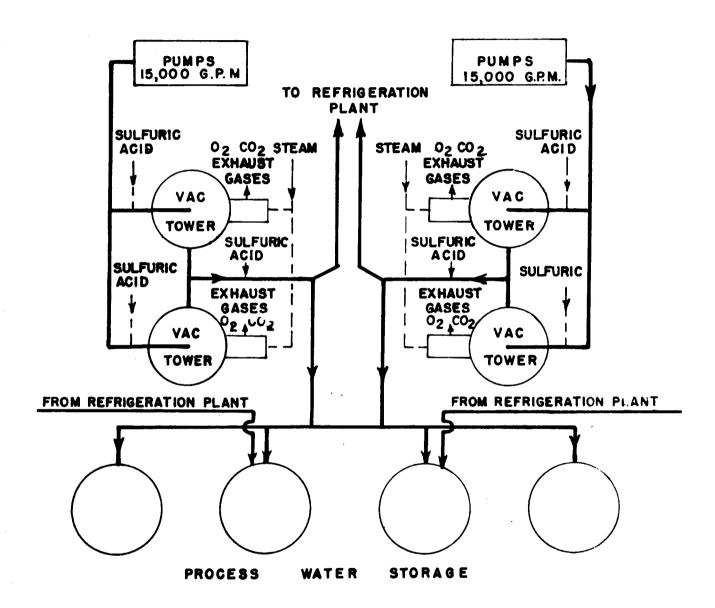
# FLOW CIRCUIT - DEMINERALIZING PLANT PROCESS WATER







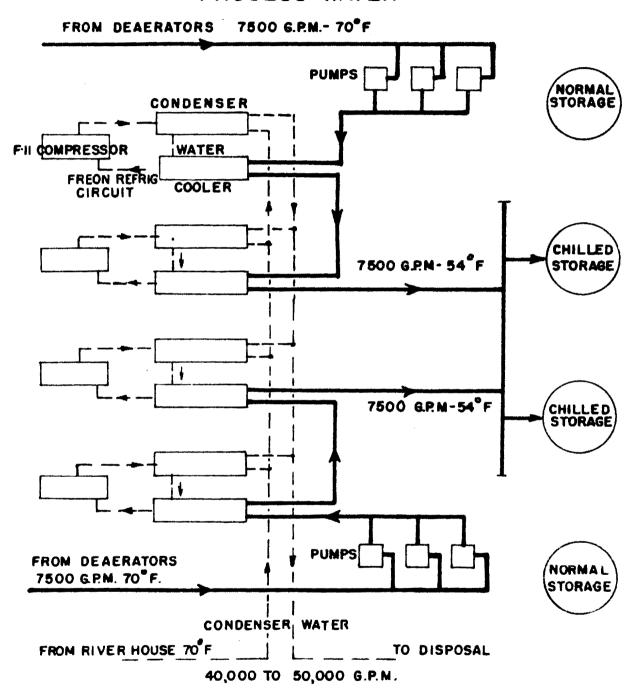
# FLOW CIRCUIT — DEAERATION PLANT PROCESS WATER

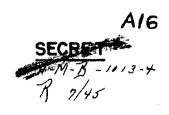






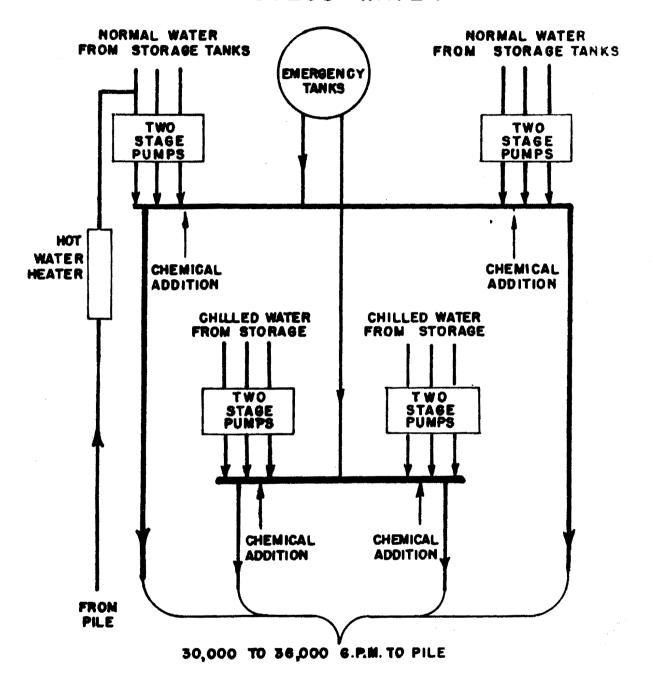
# FLOW CIRCUIT - REFRIGERATION PLANT PROCESS WATER

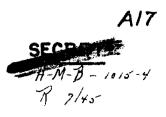


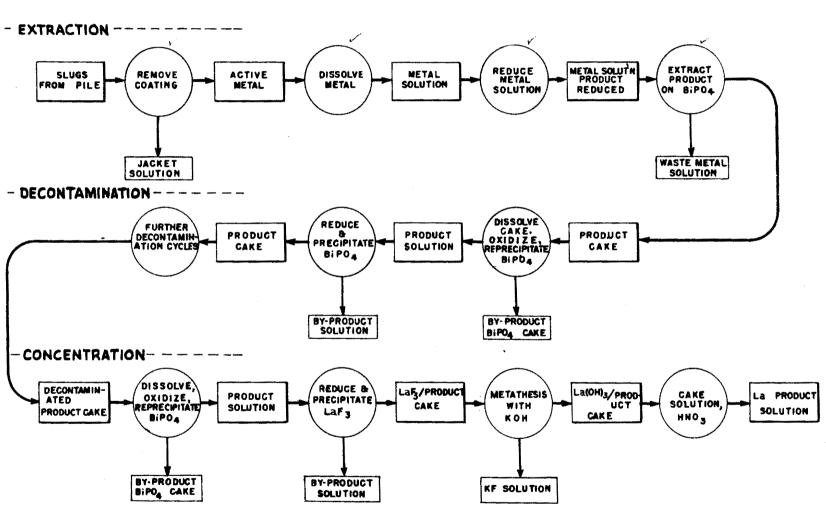


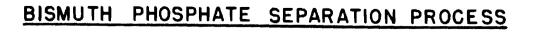


# FLOW CIRCUIT- VALVE PIT PROCESS WATER





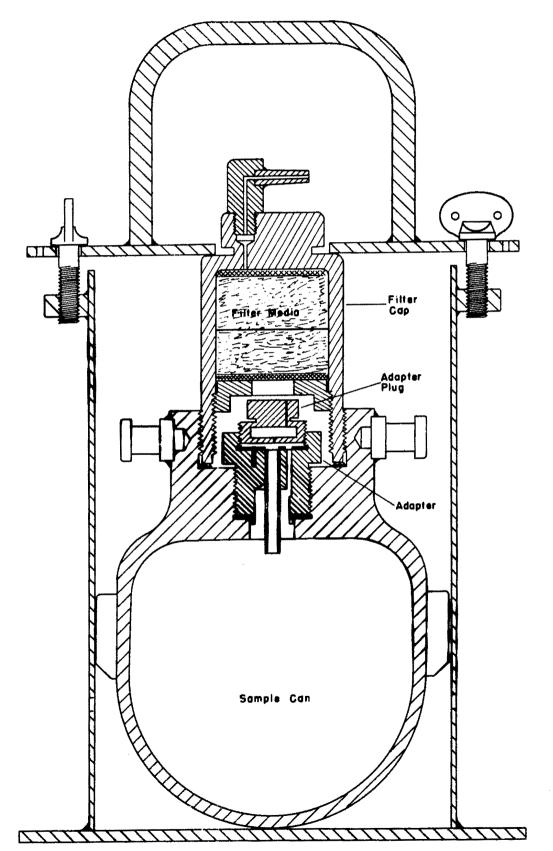








# SAMPLE CAN AND CASE ASSEMBLY



A 19



SECZET

METAL FABRICATION AND TESTING (300) AREA





## APPENDIX A 20

ARRIAL VIEW OF TETAL FARRICATION AND TESTING (300) AREA



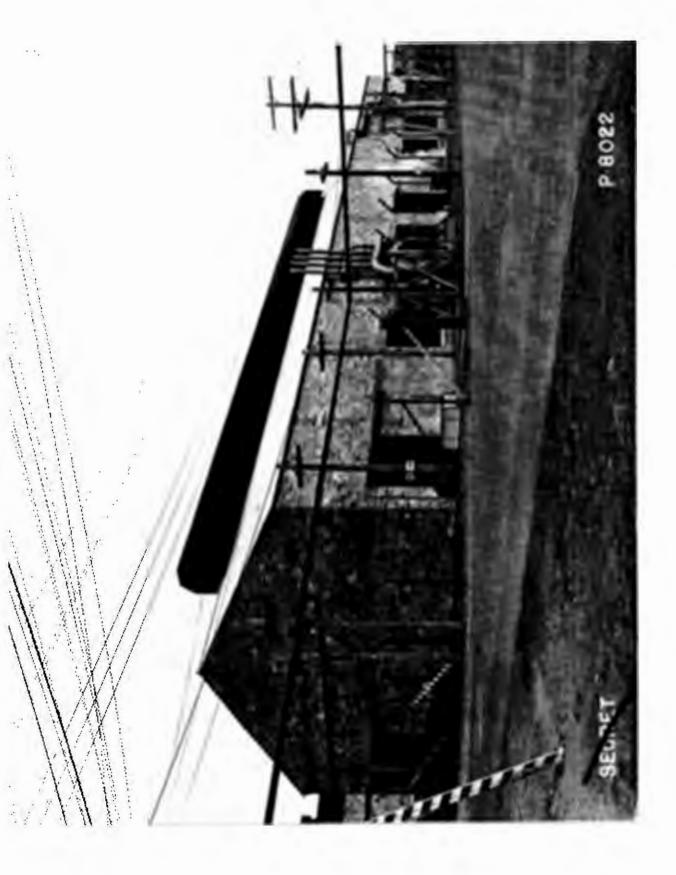




#### APPENDIX A 21

## PRESS BUTLDING (314)

This building contains an hydraulic press where billets are extruded into rods, and equipment for out-gassing, cropping, and final straightening of the uranium rods.





#### APPENDIX A 22

#### METAL FARRICATION BUILDING (313)

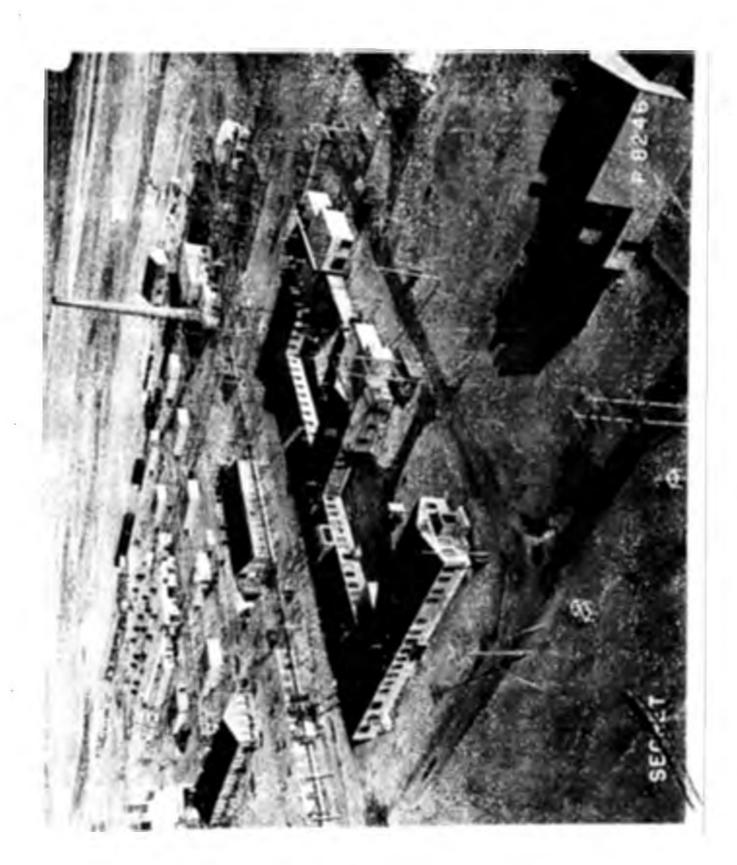
This building contains facilities for machining uranium rods into short cylinders (slugs); canning the slugs; and testing the cannot slugs preparatory to use in the transmutation process.



## ACCUMPAN A 23

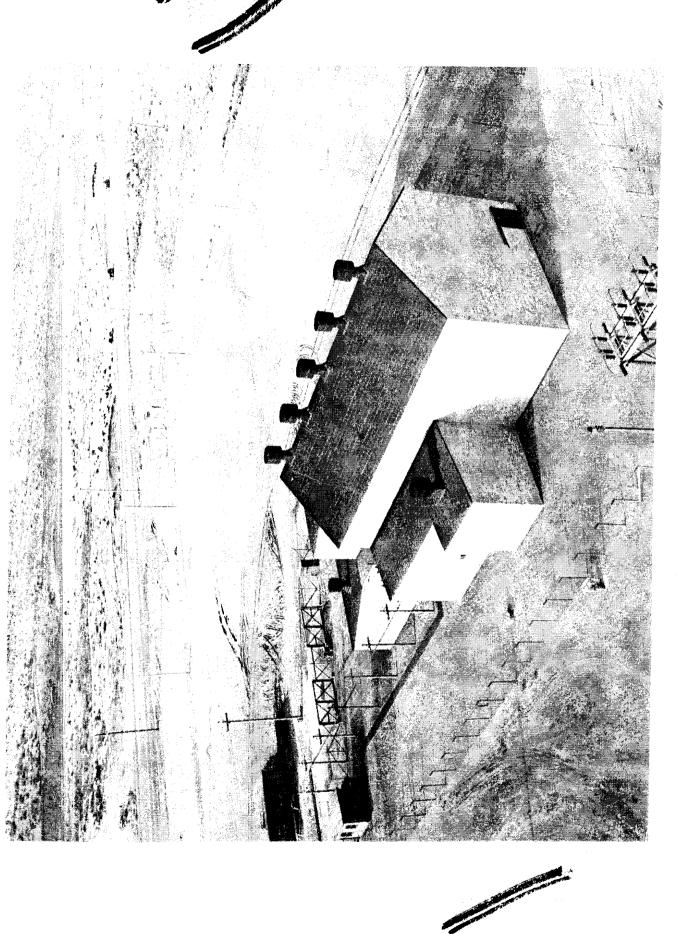
OFFICE, LIBRARY, AND LABORATORY (300 ARFA)

This building includes laboratories for instrument development and analytical control and the development necessary in connection with the plant processes.



# TEST PILE BUILDING (305)

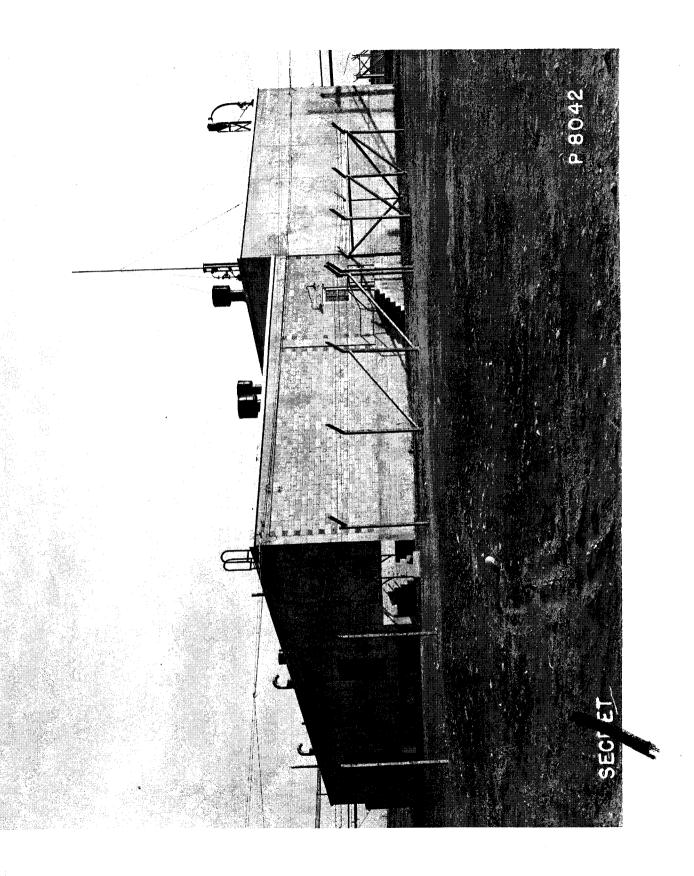
This building houses a test file for determining the neutron absorption or emission properties of all materials such as graphite and uranium used in the manufacturing piles.



# APPINDIX A 25

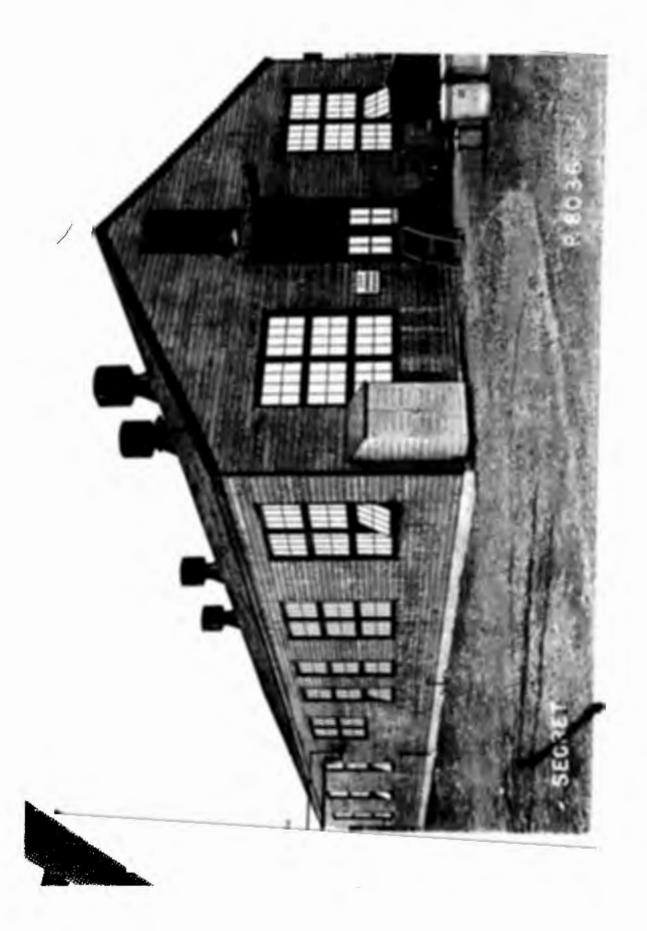
# SEPARATION PLANT (321 BUILDING)

This Semi-works is located in the 300 Ares for investigating problems arising in the separation and isolation of plutonium from uranium and fission by-product elements.



# INSTRUMENT SHOP (3717 BUILDING)

This building contains facilities for maintenance, modification, and calibration of the many types of electronic and other instruments required in the manufacturing processes and safety surveys.



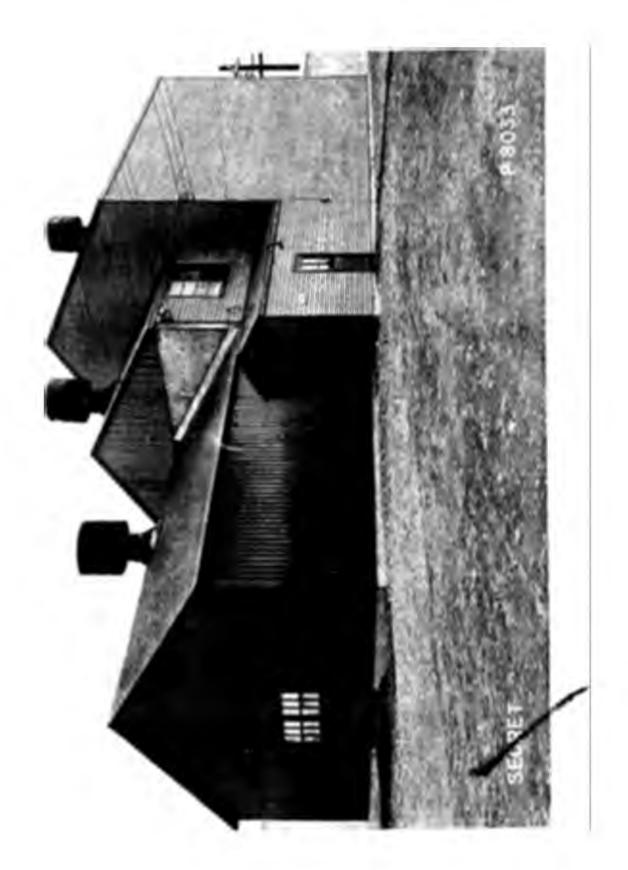


## APPLIOTA A 27

# STANDARD BULLDING (3745)

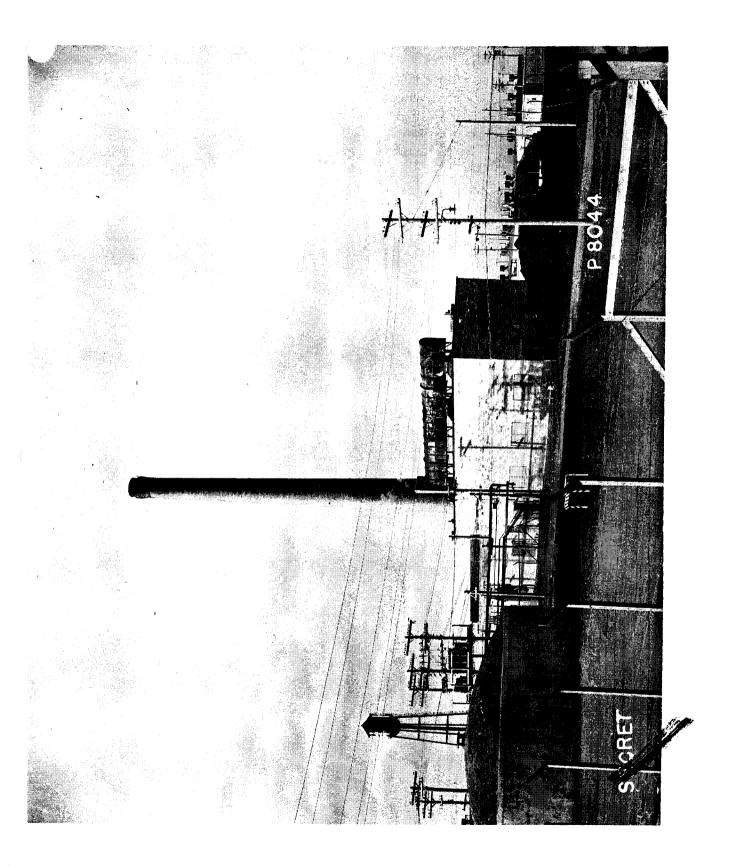
This building provides for the storage and the use of radium and radium-beryllium sources required for calibration of special instruments. A small special Pils for calibrating the monitoring and control equipment is also located here:





appendix a 28

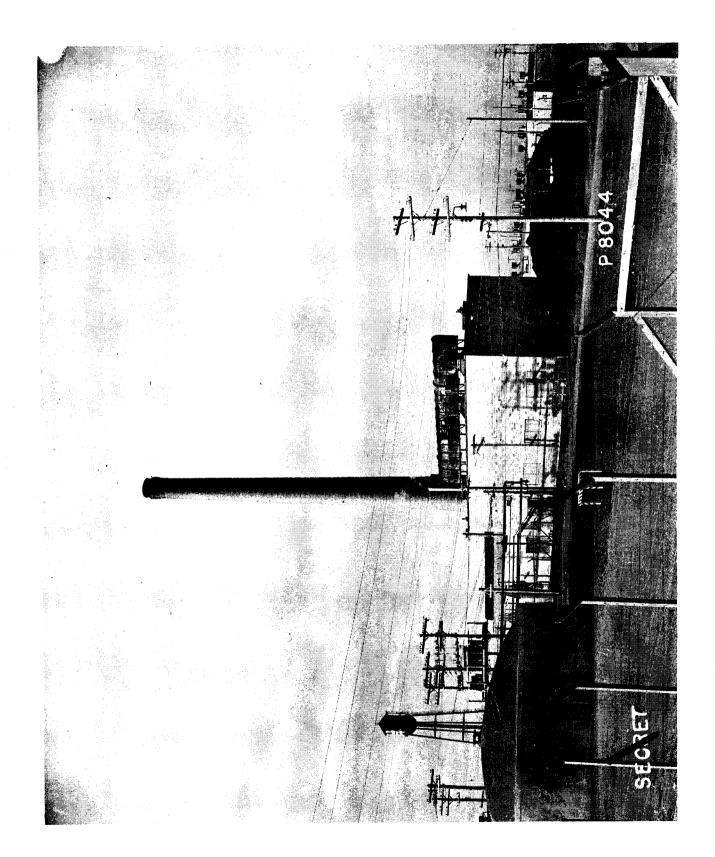
HEATING PLANT (384 BUILDING)



PITA (100) AND



APRIAL VIEW OF PILE (100 B) AREA



APHIBUU A 30

AFRIAL VIEW OF PILE (100 D) AREA

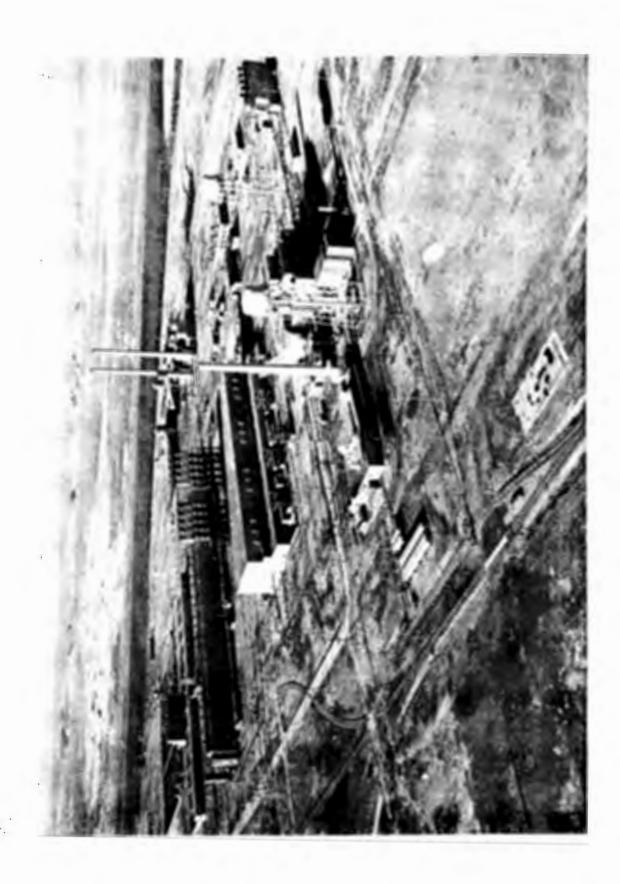


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APPENDIA A 31

ABRIAL VIEW OF PILE (100 F) ANEA

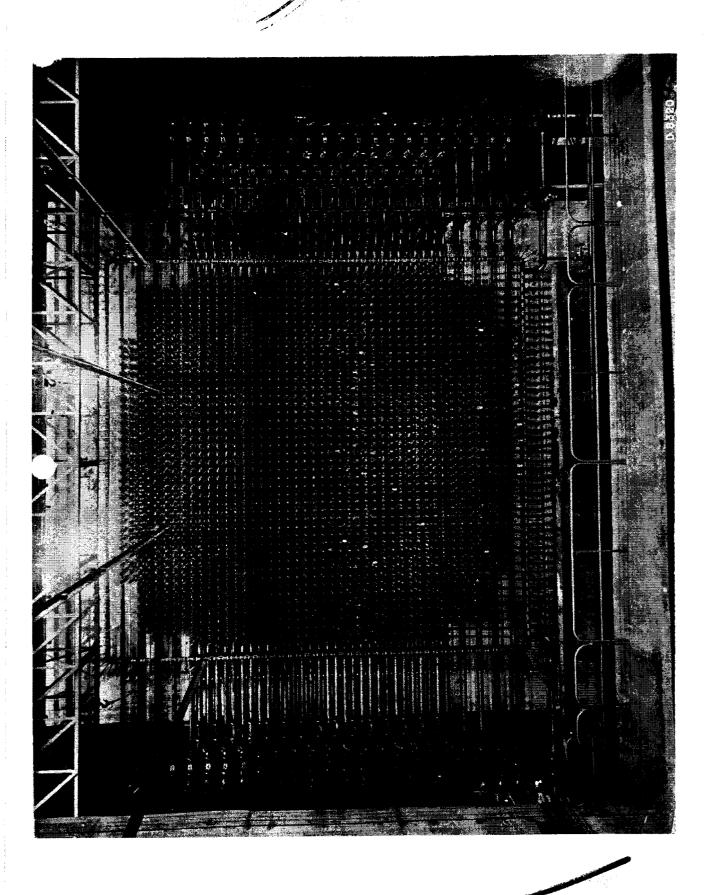




PILE CHARGE FACE (105 PILE BUILDING)

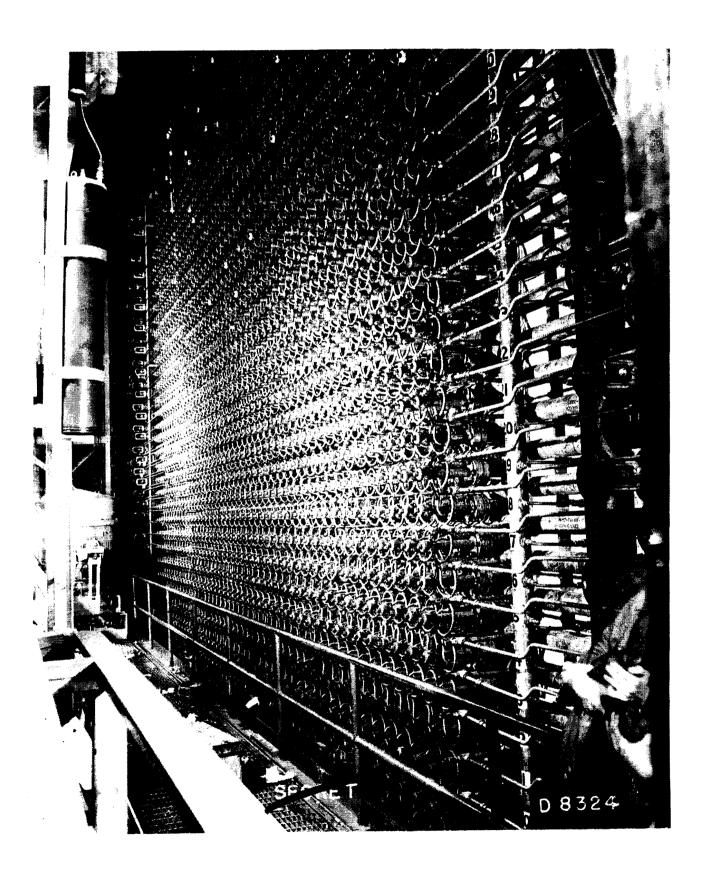


PILE DESCHARGE FACE (105 PILE BUILDING)



# apremoix a 34

HELLIUM PURIFICATION BUILDING (115 F)



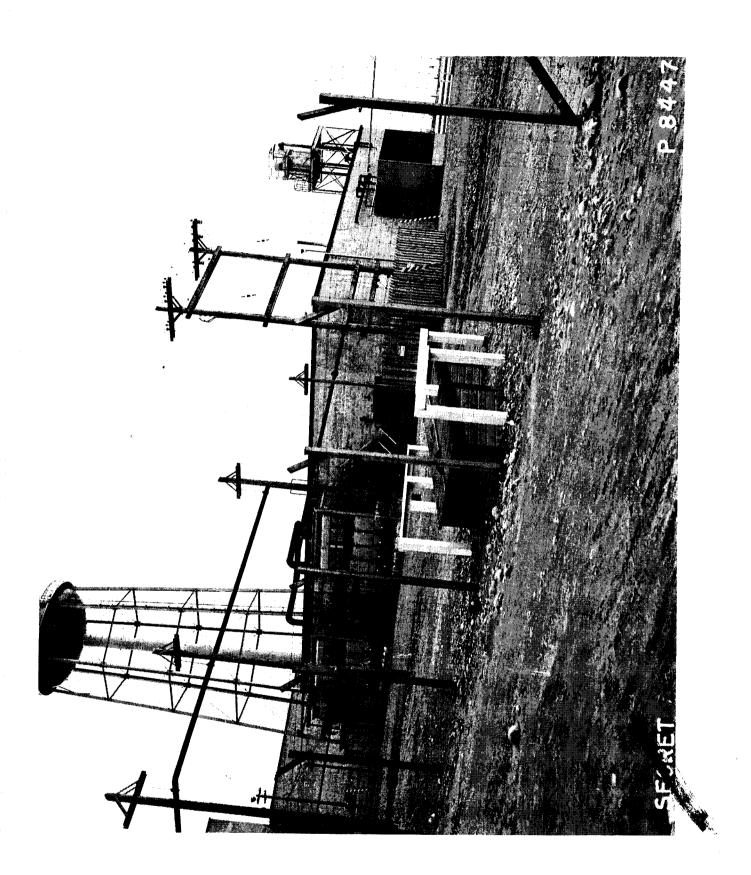
CAS STORAGE TANKS (110 D)



## PILE CONTROL RODS

The rods enter the Pile through a specially constructed hole in the Pile shield and equipped so that they can be remotely operated. The rear section, not shown, is primarily a mechanical linkage between the section of the rod that enters the Pile and the drive and water supply.



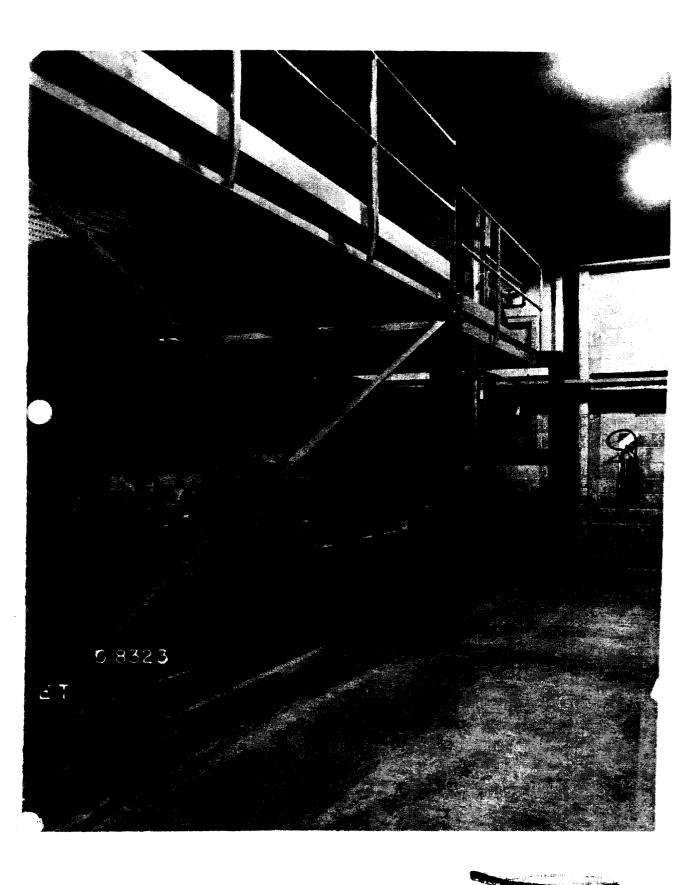




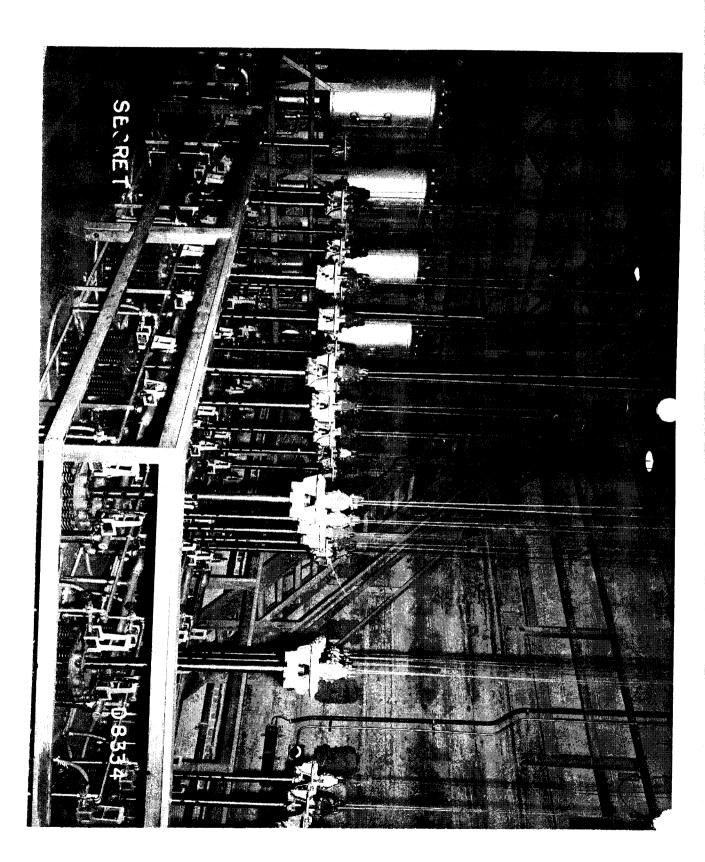
#### SAFETY RODS

The rod is suspended above the pile with the lower end of the rod coinciding with the bettom face of the top thermal shield. The rod is suspended by two cables that are wound right and left handed around the barrel of the winch, which is supported 40 feet above the top of the pile.





APPENDIX A 38
SAFETY ROD VINCHES

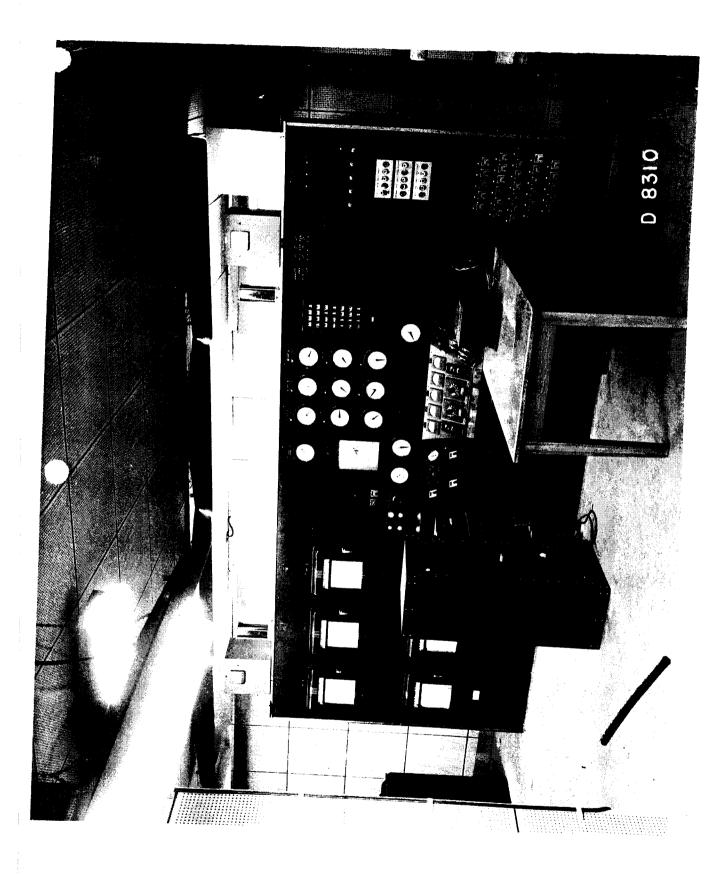




#### PILE MAIN CONTROL PANEL

The nine Selsyn indicators on the top-center of the panel indicate the position of 7 shim and 2 regulating rods. All the controls for moving the regulating rods are located on the right-hand sloping panel of the control desk. The controls on the lower right of the panel are for withdrawing or lowering safety rods individually or in groups.



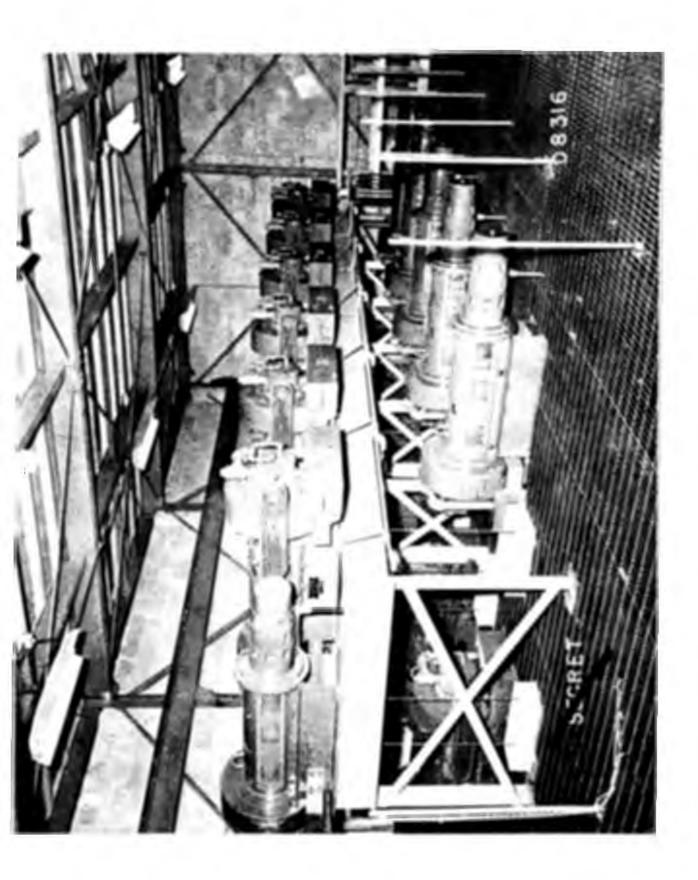




#### PILE MISCELLAMEOUS CONTROL PAREL

The two gauges at top-left indicate the Helium pressure. The other 20 at the top indicate shim rod exit water temperatures and pile exit water pressure. The recorders indicate percent of air and water in Helium and exit water temperature of rods. The panel at the extreme right is the temperature monitor. The center is a jack board containing a jack for temperature measurement of each individual tube. The other instruments are temperature recorders.



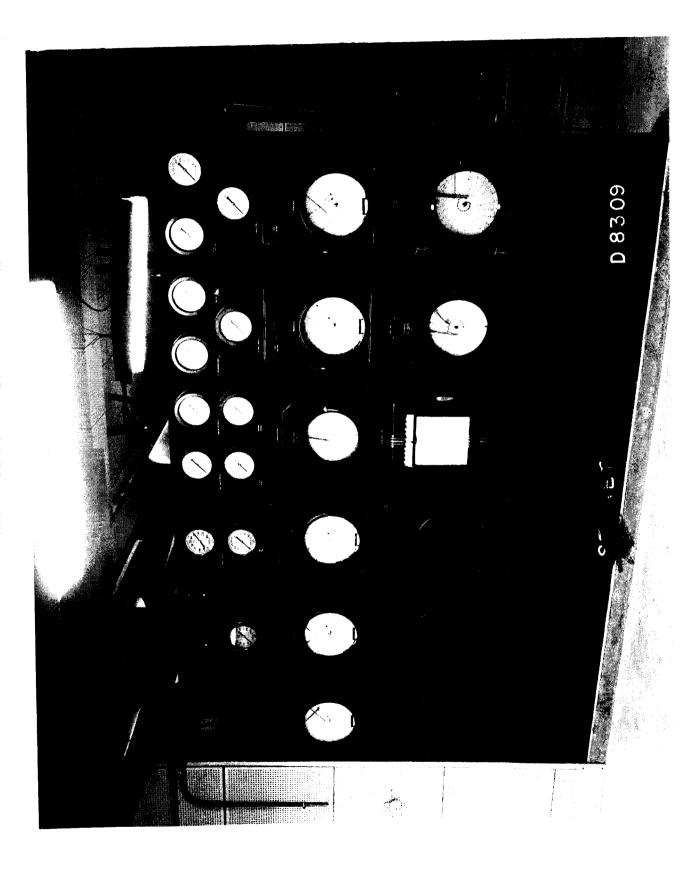




# PILE INIET VALER PAREL

This panel contains instruments for measuring and recording water pressure and temperature on the inlet and exit side of the Pile.







#### APPAROUX A 42

#### PILE PRESSUR CONTROL PANEL

This panel, divided into three sections, indicates the inlet water pressure on each tube. The gauges have, instead of the usual dial face and pointer, a rotating drum set behind the panel with only a small portion of the drum visible through a slot. The right section indicates the pressure of the top face of the Pile, and the middle section and left section indicate the middle face and bottom face of the Pile, respectively.

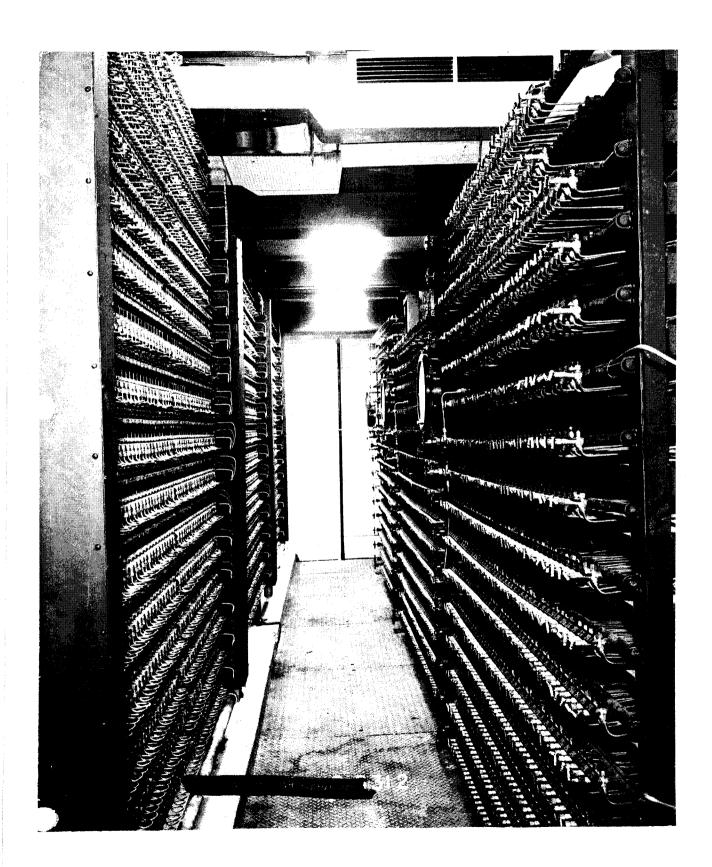






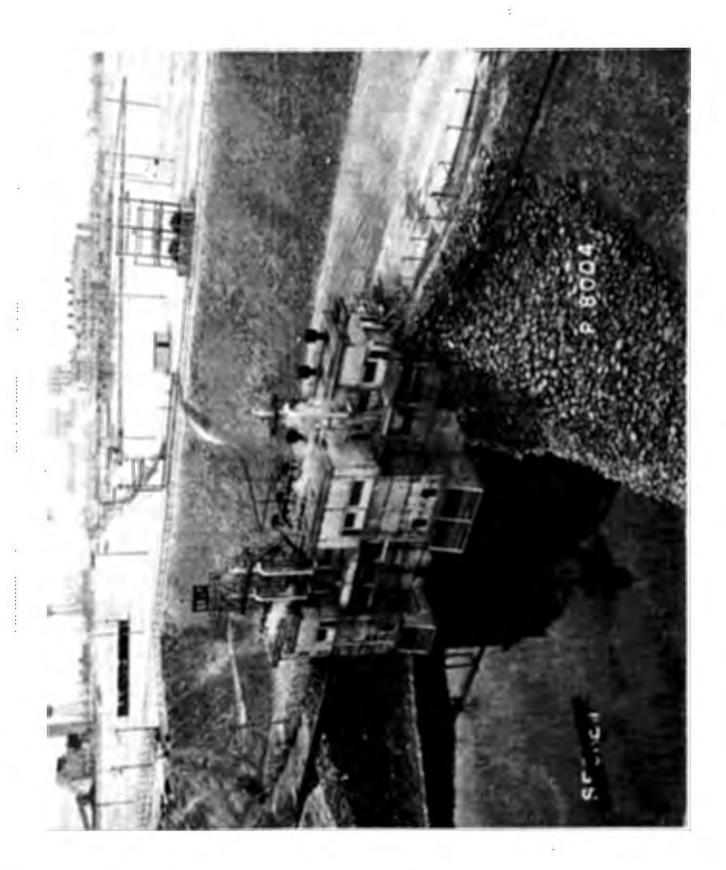
HEAR VIEW OF COMEROL BOARD (105 FILE BUILDING)





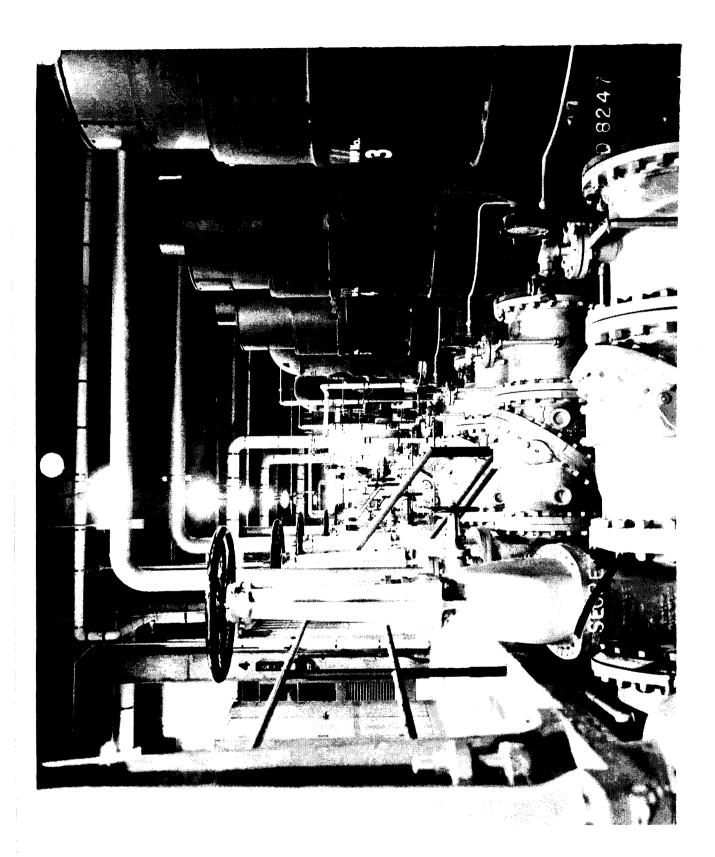
APIBADIX A 44

RIVER FUND HOUSE (181 D)

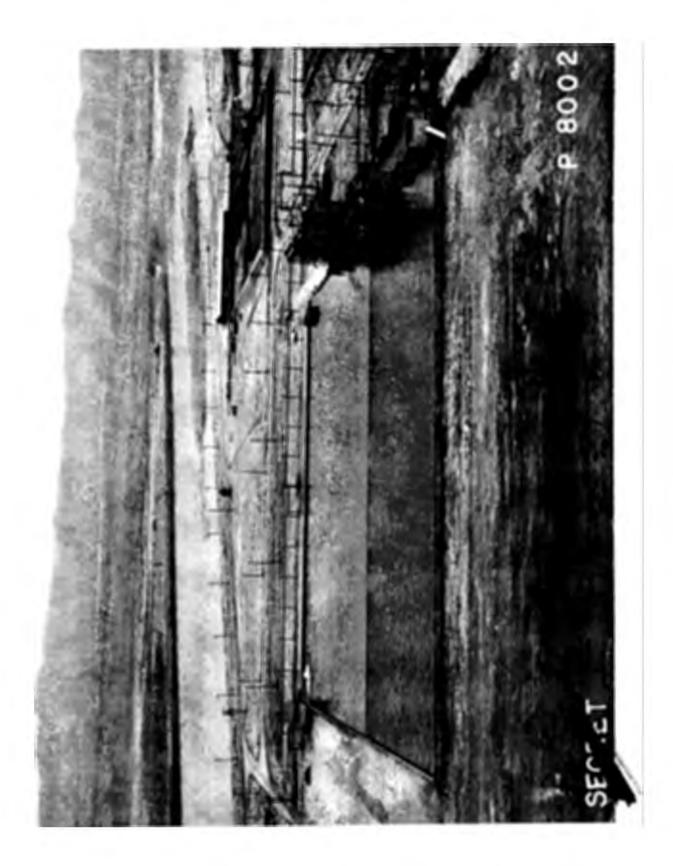


areaux a 45

RIVER POMES (181 D)



RESERVOIR AND FIMP ROLLE (180 D)



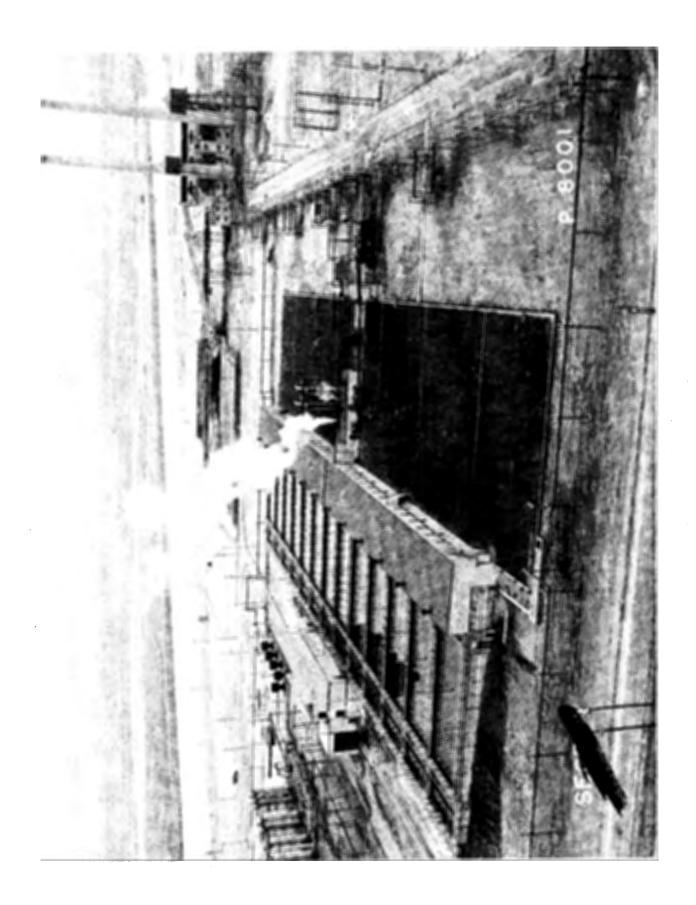
RESERVOIR PURP CALLERY



## appendix a 48

AERIAL VIEW OF FILTER FLAME (183 D)



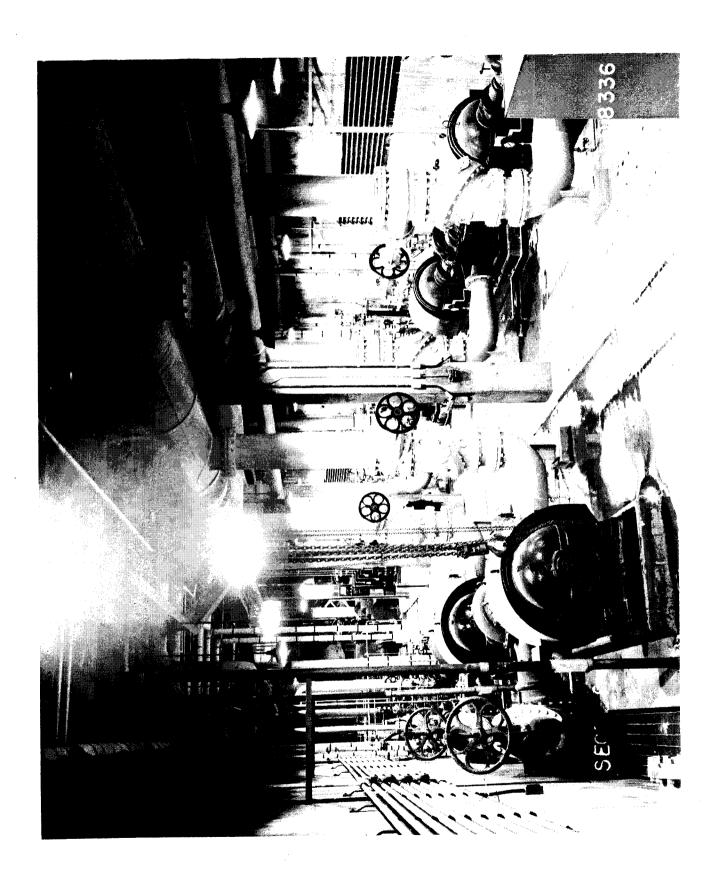




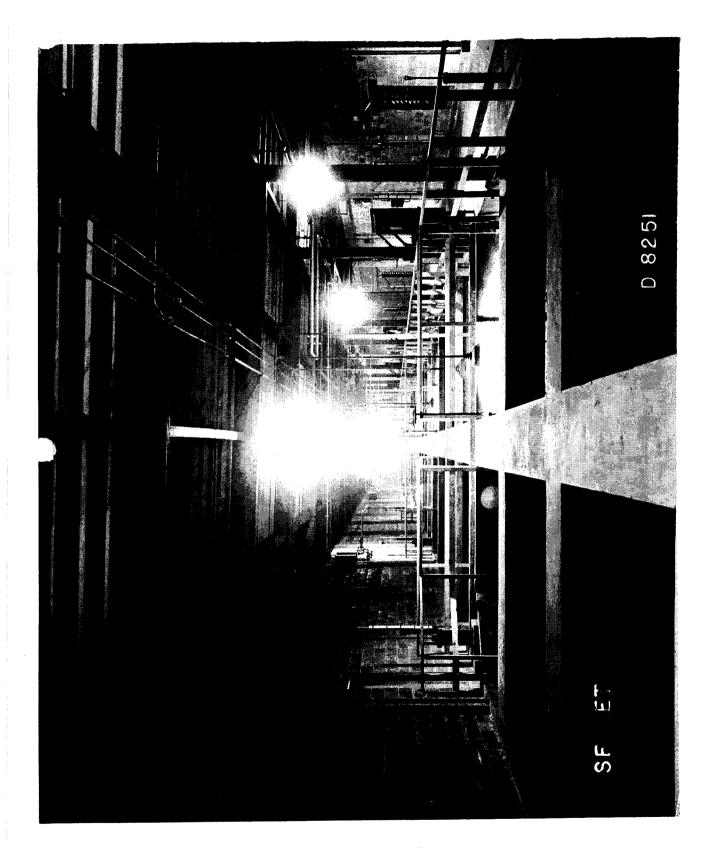
appendix a 49

FILER FAM FURS





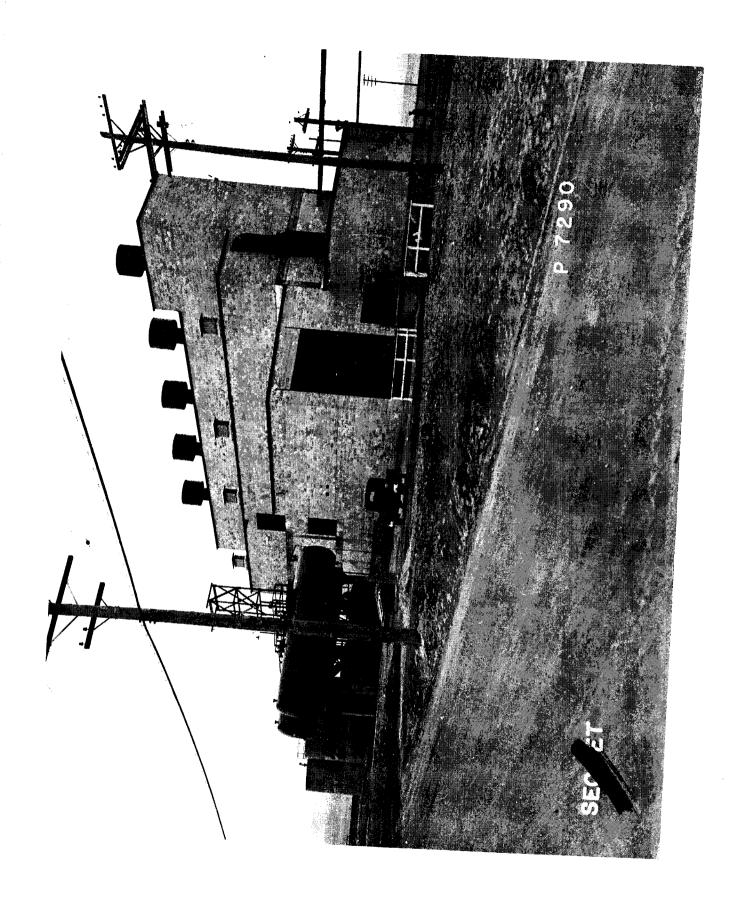
FINDATION LEDS



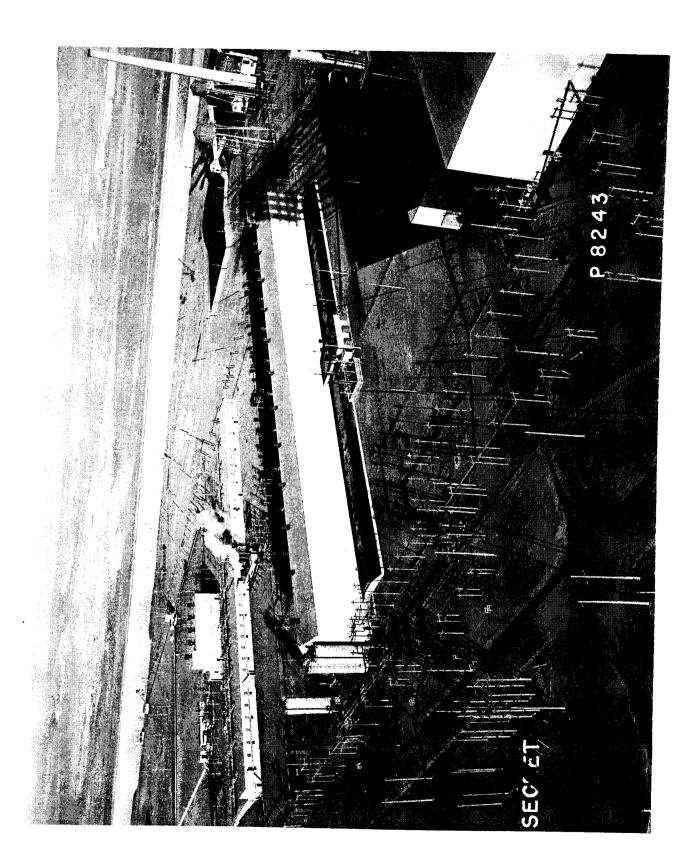


aperioux a 51

CHENCICAL PUMP HOUSE (108 D)



AERIAL VIEW OF DEMINERALIZATION PLANT (186 D)



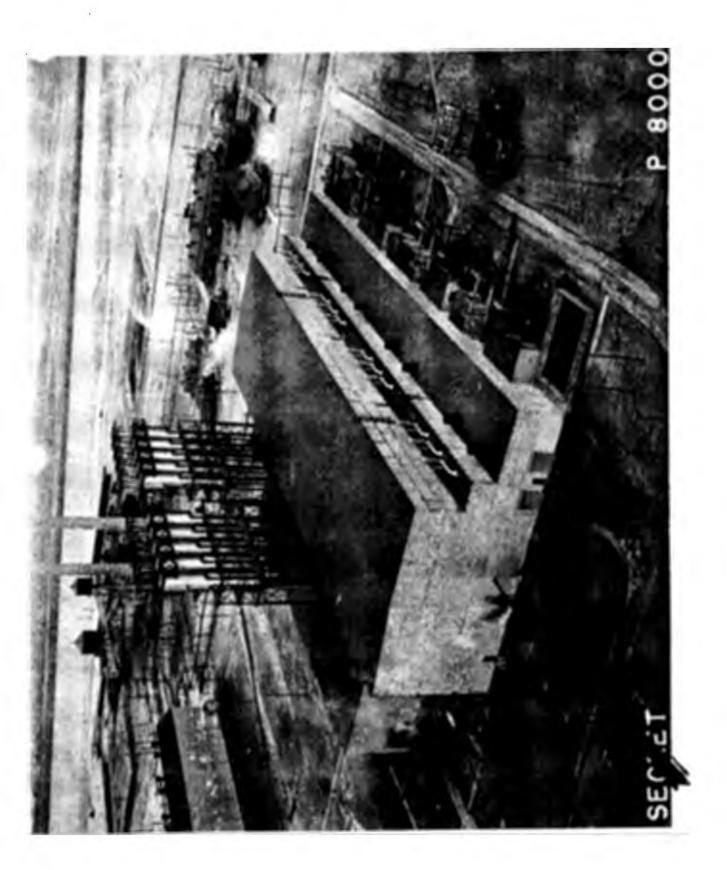


#### APPAIDIX A 55

### DEAERATING BUILDING (185 D)

The Descripting Building is the large two-story structure with ten description units mounted vertically on steel structures on the left side of the building. The Refrigeration Building is the one-story structure adjacent on the left, and the main pump house is the one-story structure adjacent to the Descripting Building on the right.

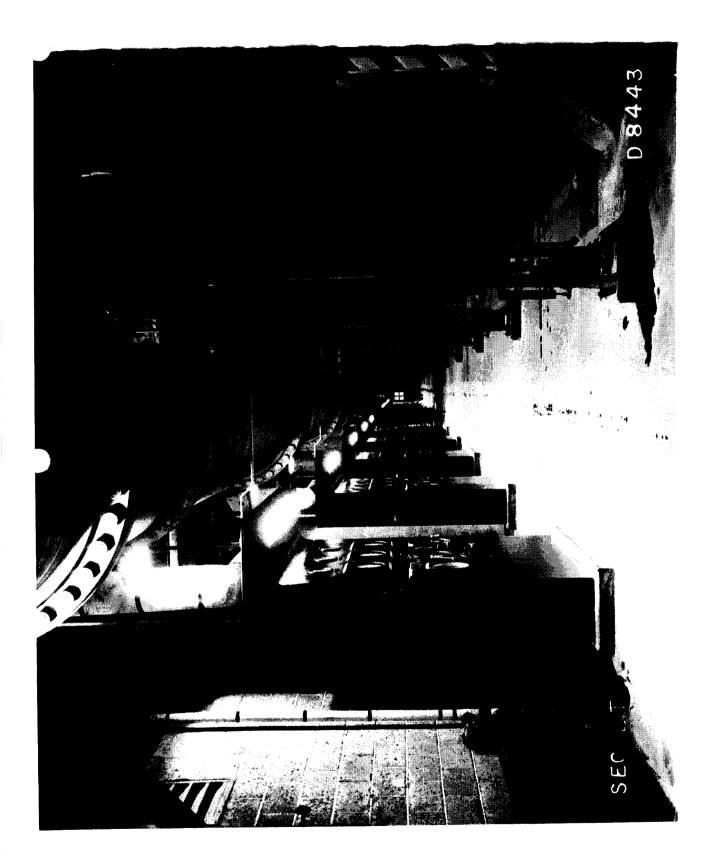






MEALBATOR CONTROL CALLERY









DEALFATOR ACID FUMPS

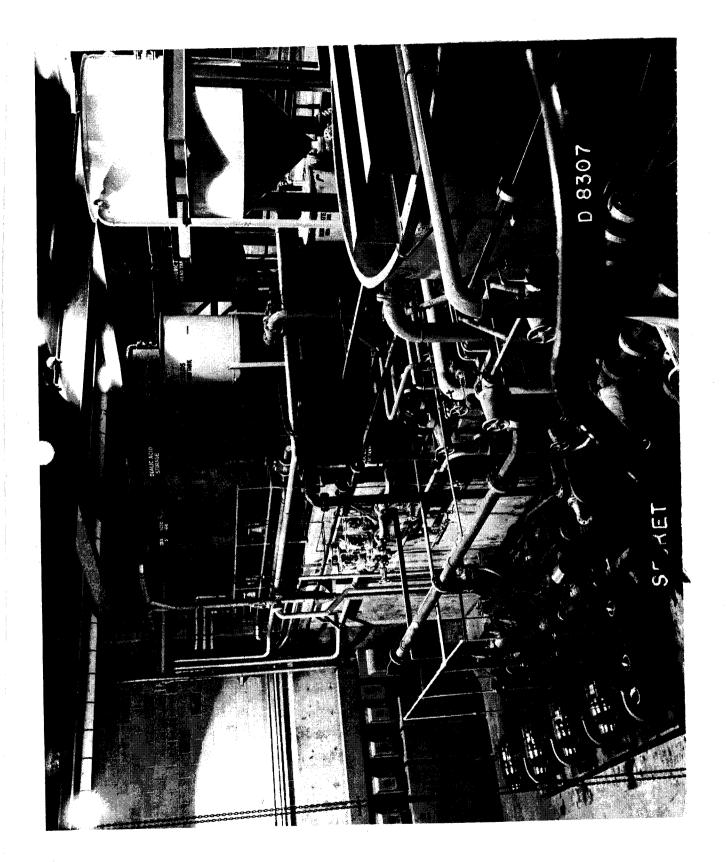






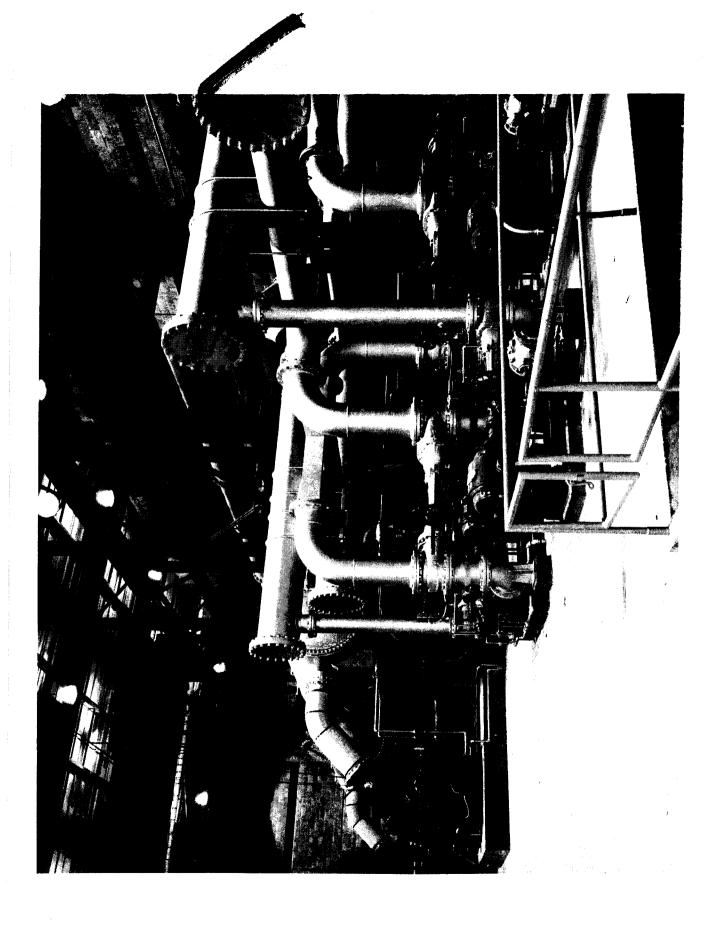


FINAL WATER CONDITIONING EQUIPMENT

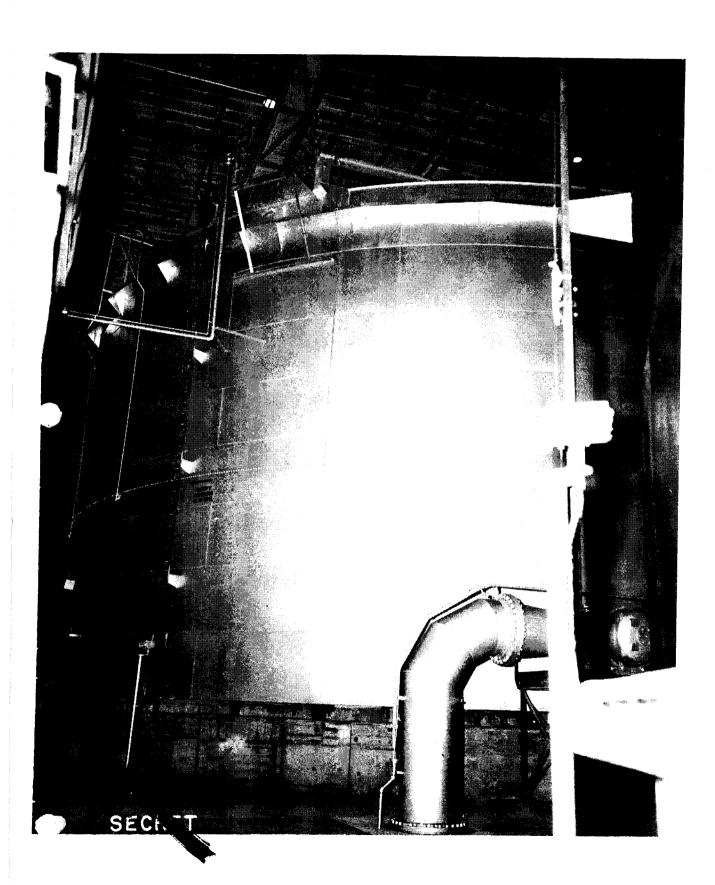




REFRICERATION EQUIPMENT (100 F BUILDING)

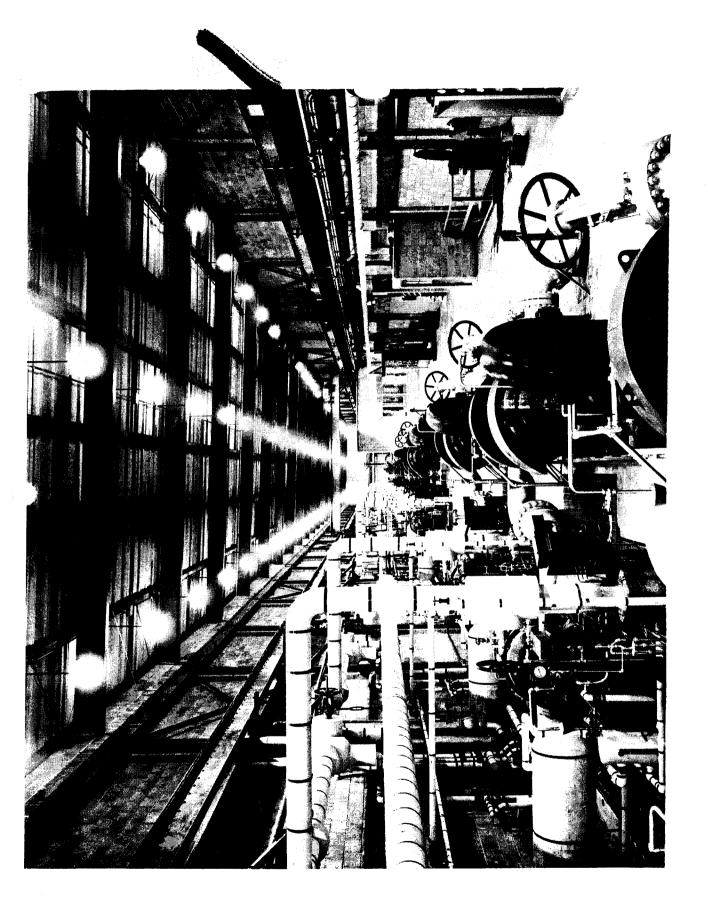


PILE AREA PROCESS VATER TANK



apernoix a 59

PILE AREA PROCESS VALUE FUMPS

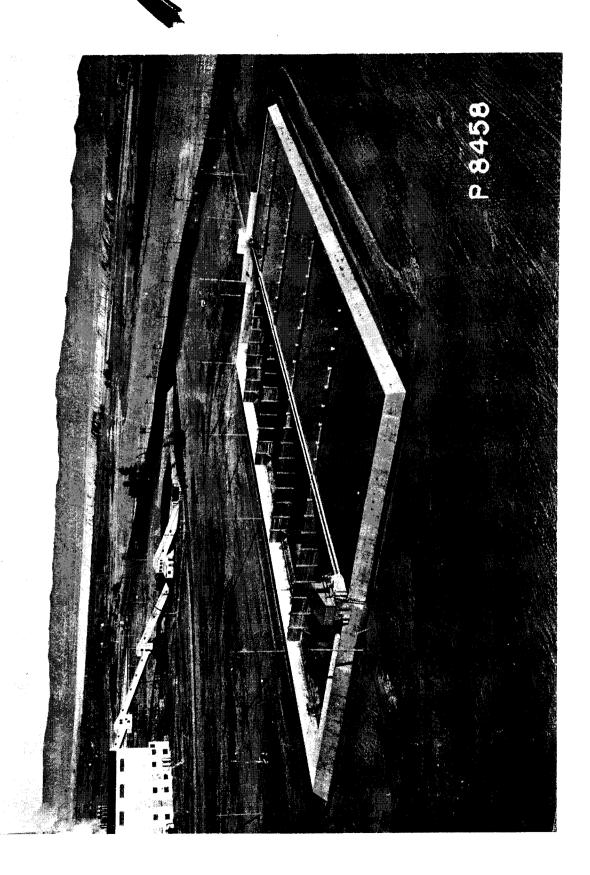




#### RETENTION BASIN

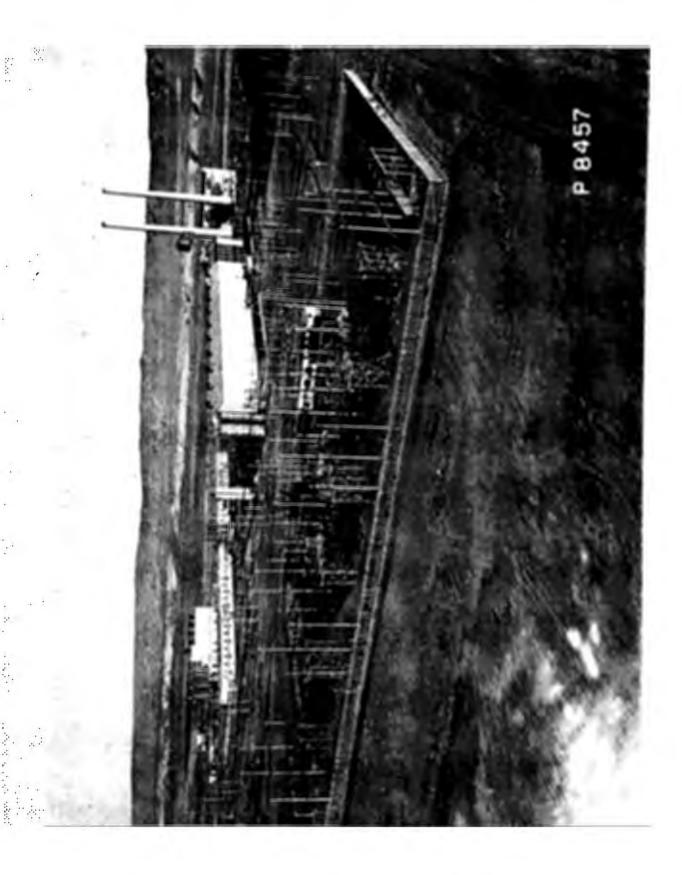
The Retention Basin consists essentially of two different reservoirs each about 465 feet long and separated by an overflow flume extending from the intake chamber to the discharge flume. This basin holds up the discharged cooling water from the Pile for a period sufficient to permit decay of the radioactivity which the water has acquired in its passage through the Pile.





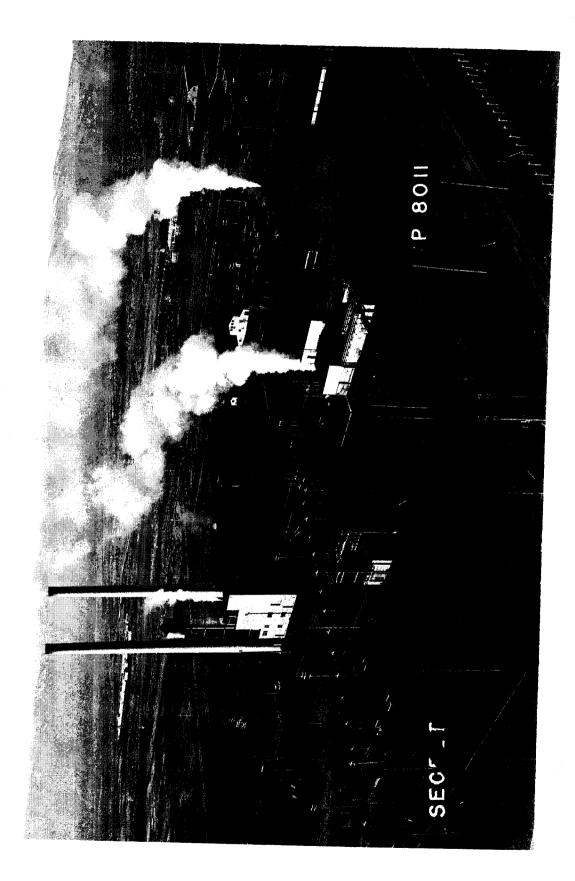
arminix a 61

PRIMARY SUBSTATION (151 D)



APPERDIX A 62

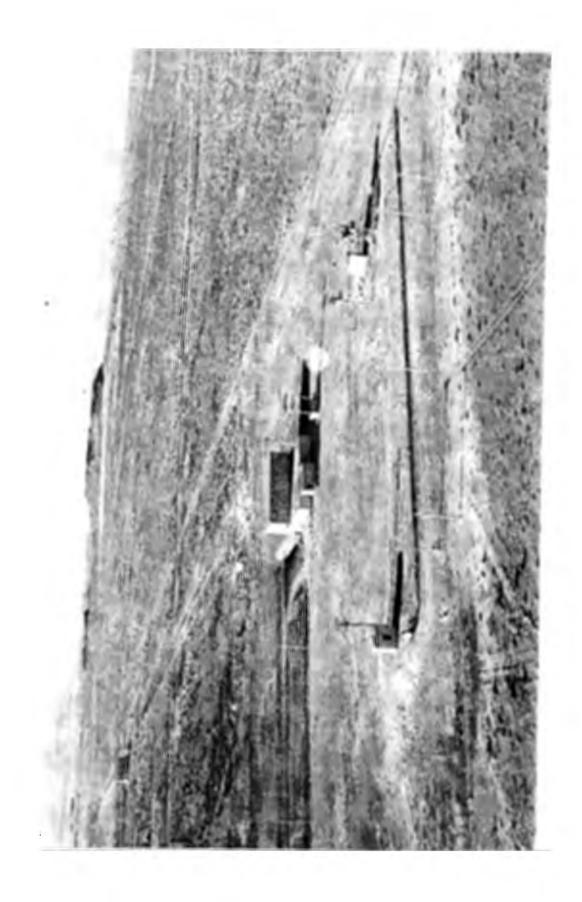
POWER HOUSE (100 AREA)



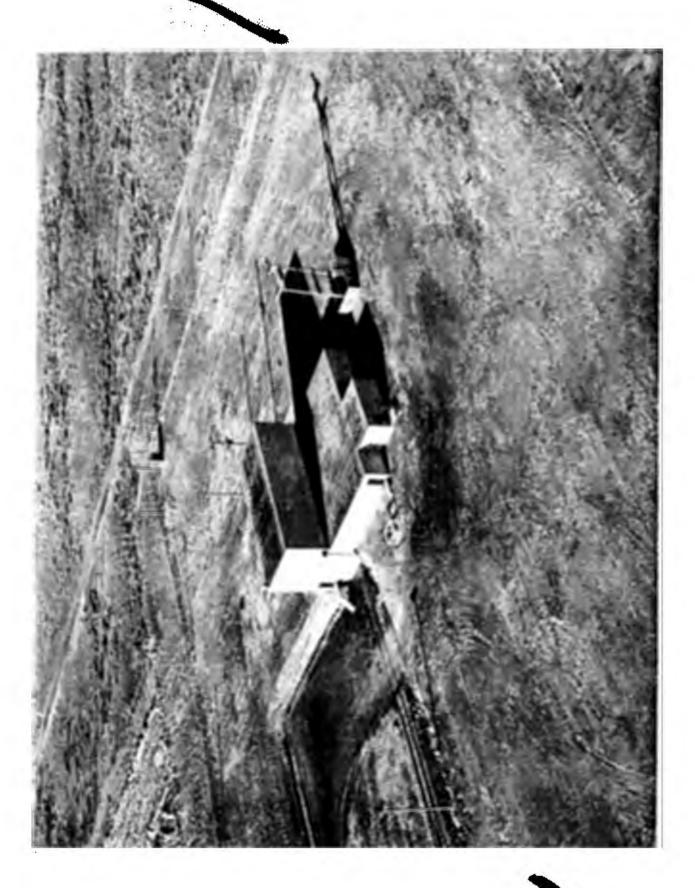
EFARTION (SOO) AREA

# appendik a 63

ARRIAL VIEW OF SEPARATION (200 N) AREA



LAG STORAGE (212 BUILDING)



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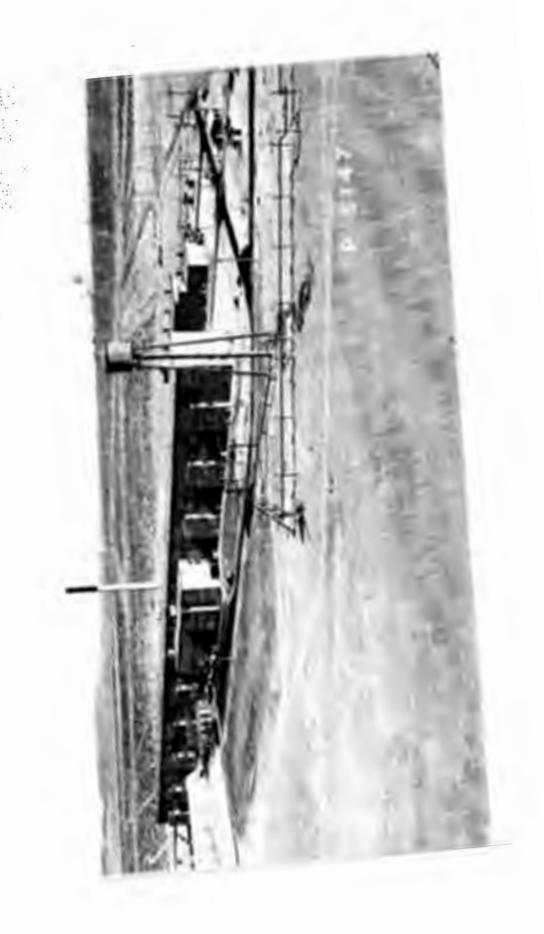
AERIAL VIEW OF SEPARATION (200 E) AFEA

AERIAL VIEW OF SERARATION (200 T) AREA



# APPEADIX A 67

AERIAL VIEW OF SEPARATION (221-T BUILDING)



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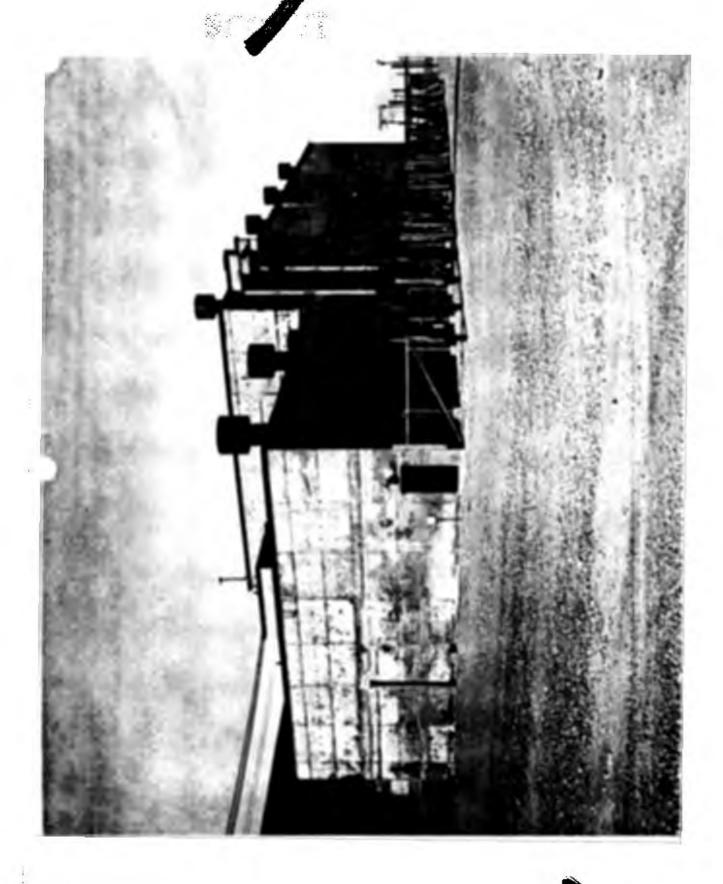
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### appendia a 68

# BULK REDUCTION BUILDING (224 T)

This is a concentration building where the crude product from the separation plant is bulk reduced and further deconteminated.



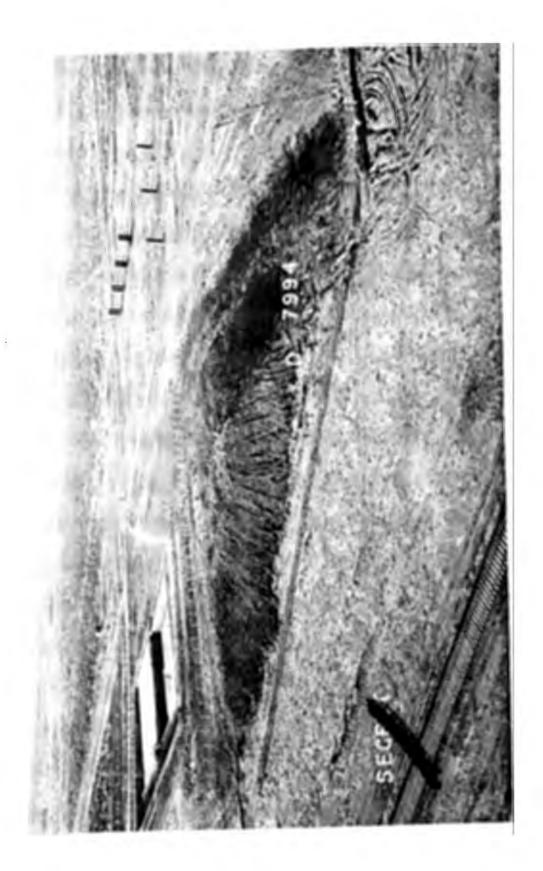


#### APPLIDIX A 69

### PROCESS WASTE STORAGE (241 T BUILDIEN)

The redicactive by-products of the separation process are stored here in shielded tanks buried in order to eliminate radiation hazards. The most active wastes (metal solution and first by-product precipitate) eventually heat up to beiling and air-cooled reflux condensers, shown on the right, are provided to eliminate tanks beiling dry. The low active waste from 224 Building and the "decayed" wastes from the storage tanks are stored in a retention pend, shown on the left.

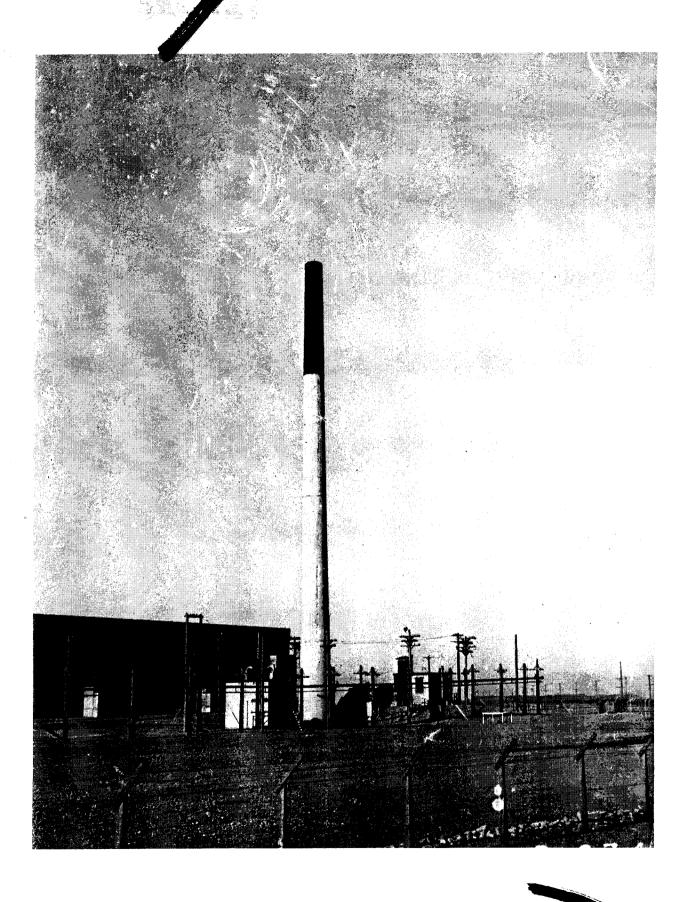






### STACK AND VENELATION BUILDING (291)

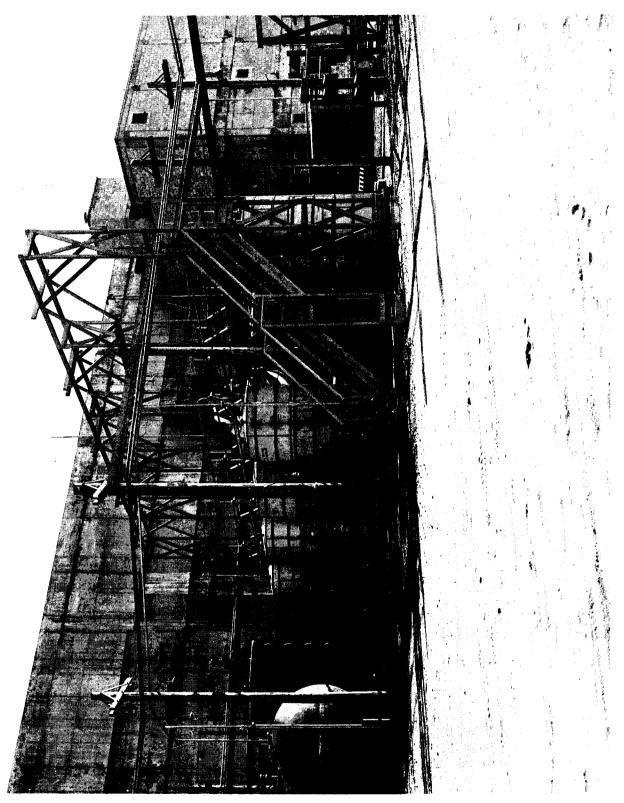
This building provides the facilities for handling the main ventilation requirements for Building No. 221 and for disposing of gaseous radioactive products into the atmosphere.





VERTICAL ACID STORAGE TANKS (211)

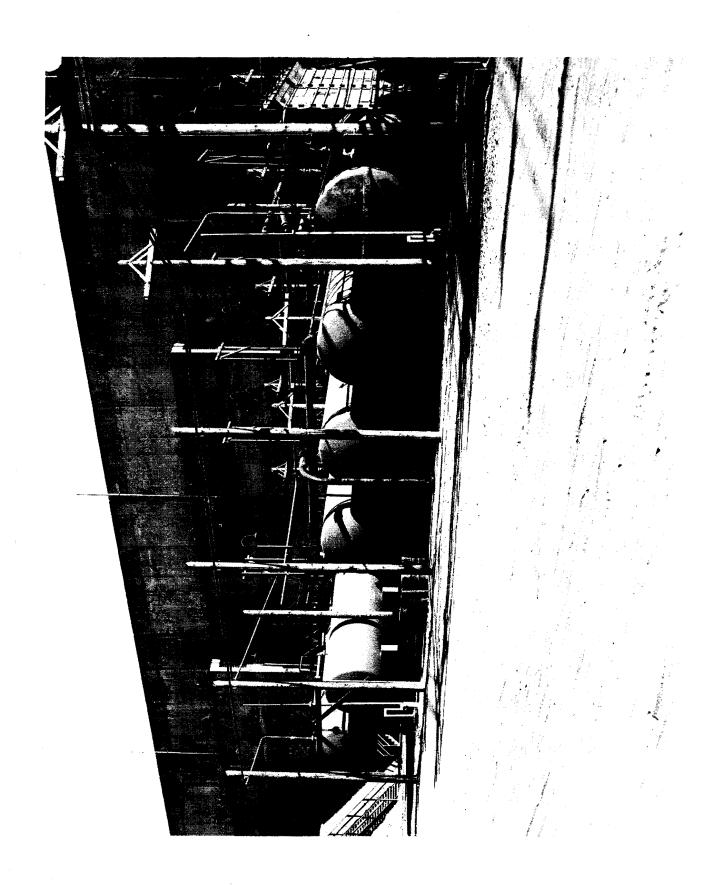






# APRIDIX A 72

HORIZONTAL ACID STORAGE TANKS (211)

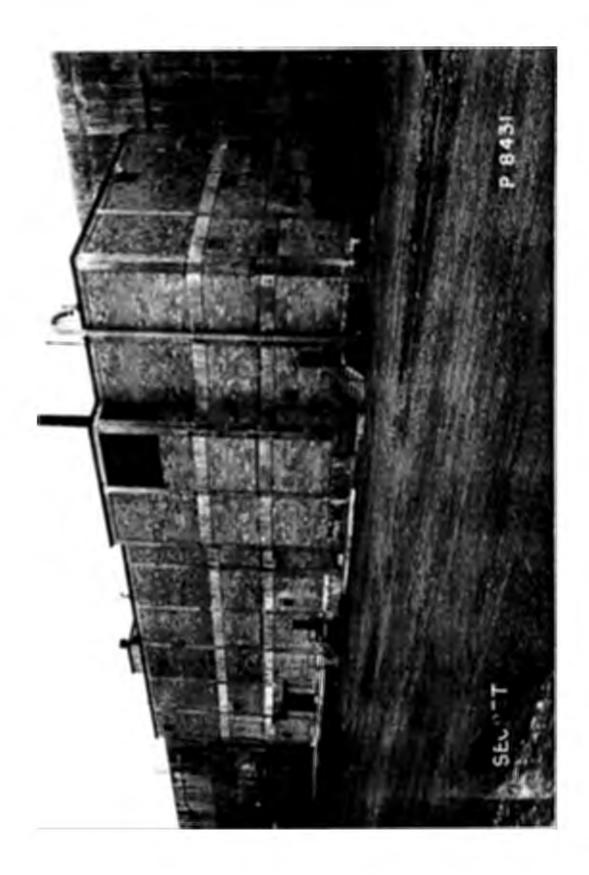




### CHEMICAL PREPARATION AND SERVICE BUILDING (271 T)

Provides facilities for preparation of process chemicals and serves as administrative headquarters for the operation of the process.





### APPANDIX A 74

SAMPLE PREPARATION LABORATORY (222-T BUILDING)
This building houses the control laboratories for the process.



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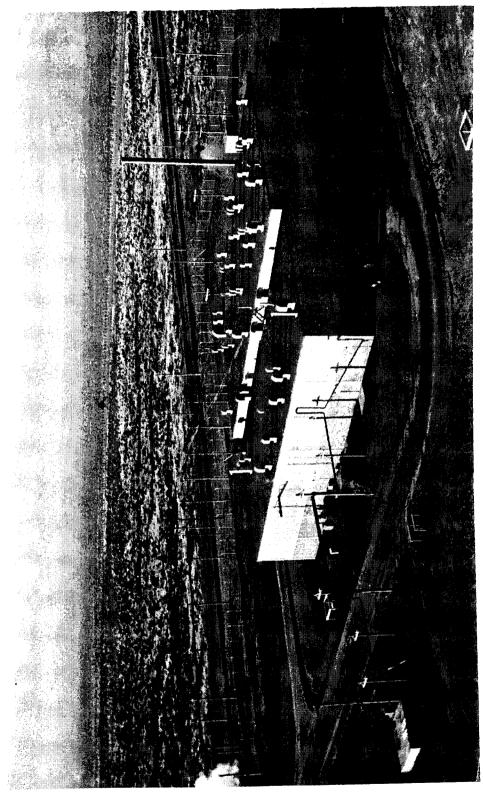
### APARIOUX A 75

### ISOLATION BUILDING (231 W)

Contains equipment for the final isolation of the product. Only one 231 Building is provided to handle the output from all the 200 area separation plants.





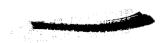






# AREA SHOP (272 E BUILDING)

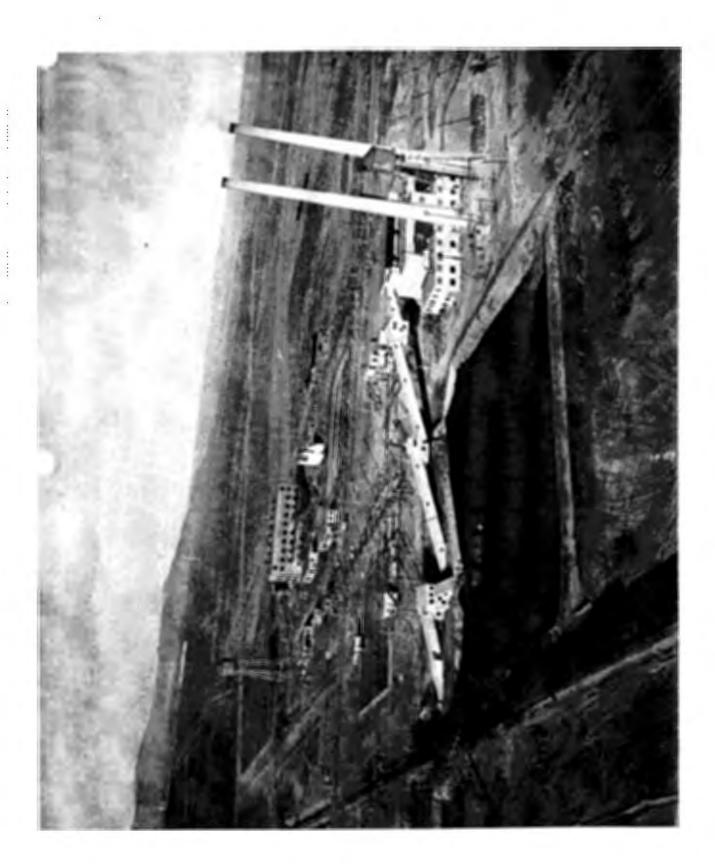
This building houses a Machine Shop, Electrical Shop, Pipe Shop and Carpenter Shop for maintenance of the operating equipment in Building 221.



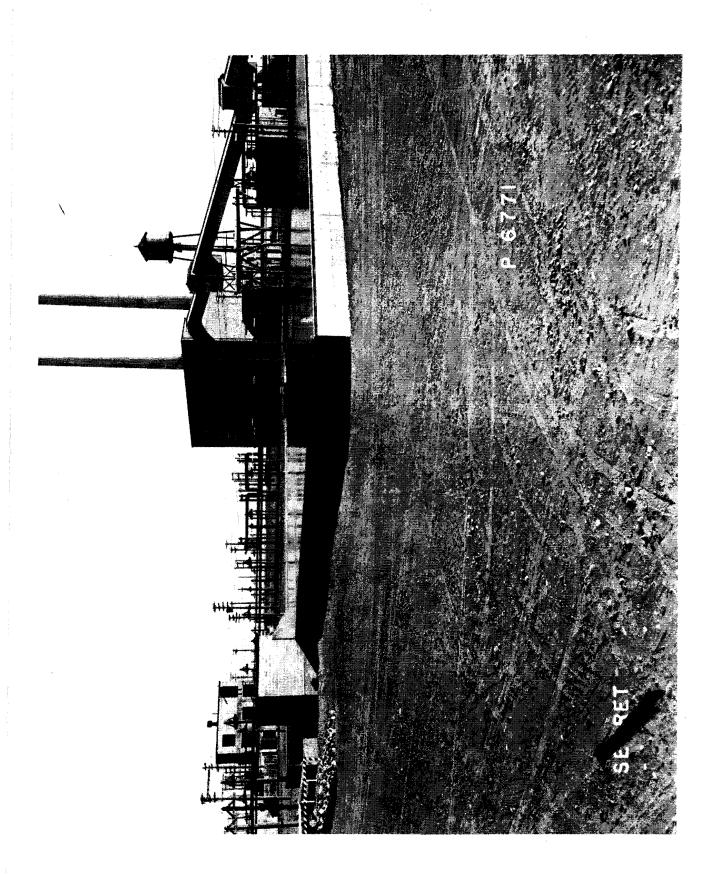


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POWER PLANT (200 E AREA)



RESERVOIR AND FIMP HOUSE (282 W)



APMENDIX A 79

FILTER PLANT (283 W)





## HEAT TREATING FURMACE DULLDING (273 E)

A Heat Treating Furnace with necessary facilities for the purpose of heat treating and pickling piping and equipment is housed in this building adjacent to Building  $272\ E$ .



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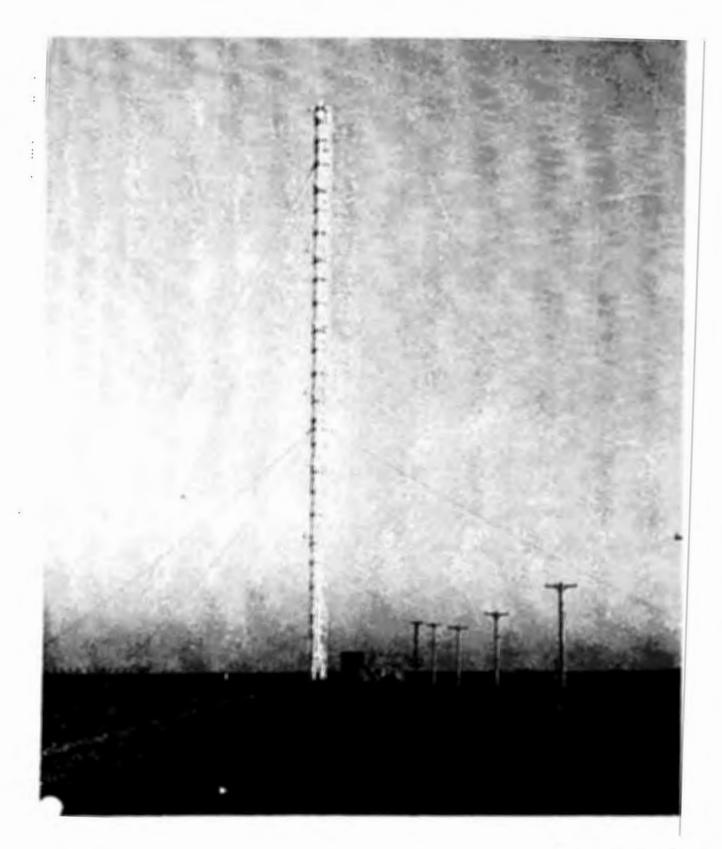
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METEOROLOGICAL TOWER







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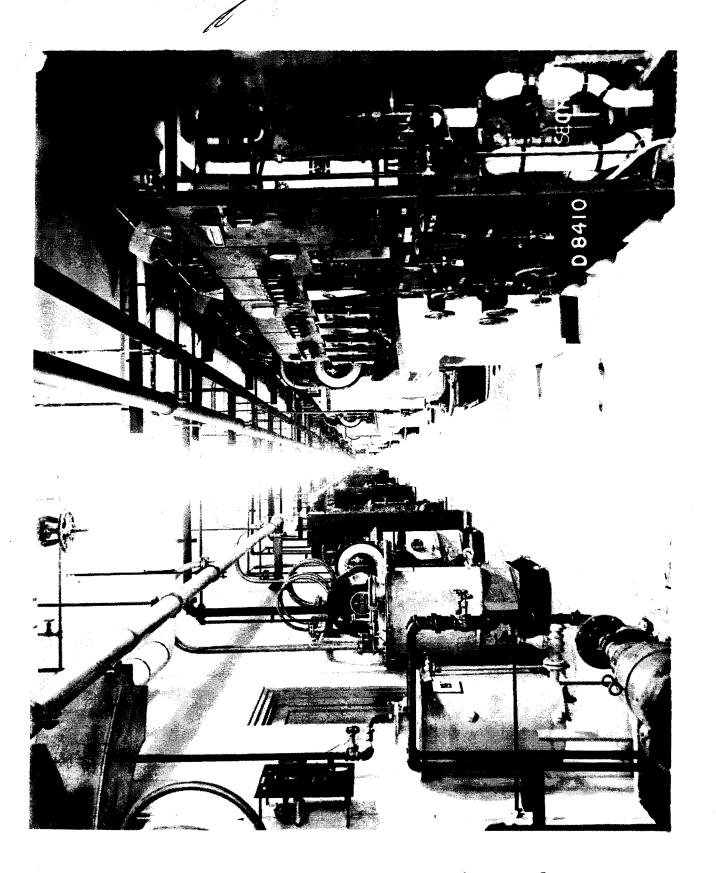


### appendix a Be

## OBGRATING GALLERY (221 BHILDING)

The operating gallery is the control center for cell equipment. At each section is a gauge board from which control and instrument lines run to the cells, via the pipe gallery. Weigh tanks are provided with inlet connections from appropriate chemical headers in the pipe gallery and outlets to the cell vessel connections.

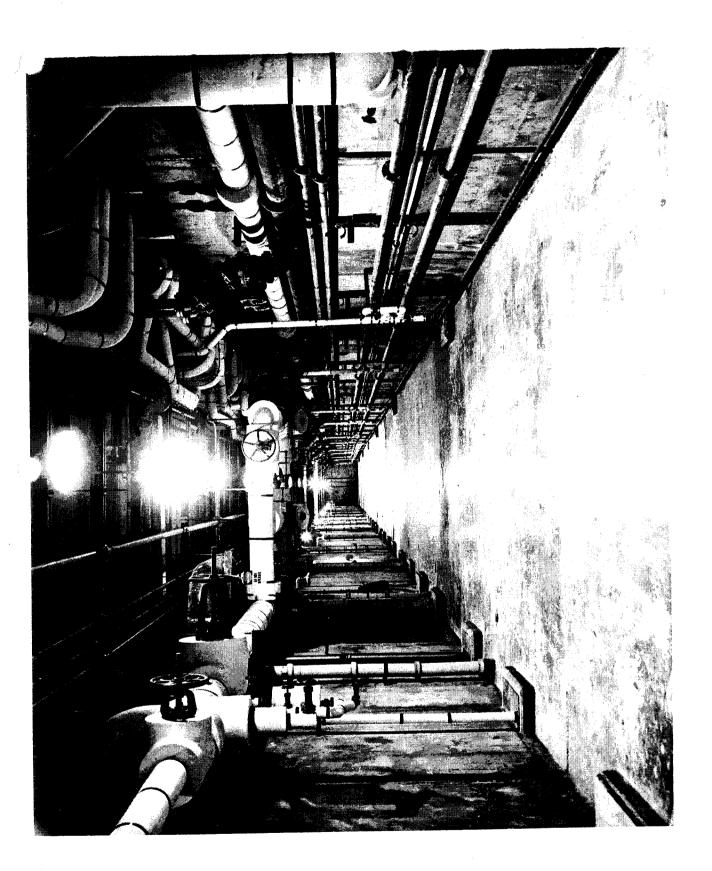




NUCLEAR INFORMATION

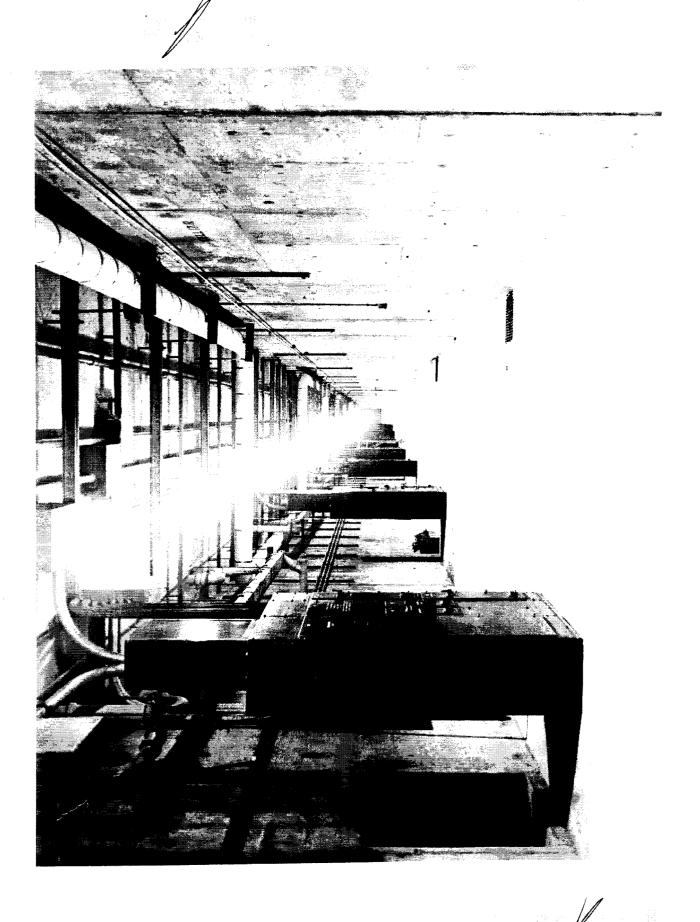
#### PIPE CALLERY (221 BUILDING)

All cell piping except process transfer lines is brought up to the pipe gallery, terminating in connections on the wall. From here, connections are made to the weigh tanks and control boards in the operating gallery. Chemical headers, electrical and steam distribution lines are located in this gallery.



## FIECHNICAL CALLERY (S21 BUILDING)

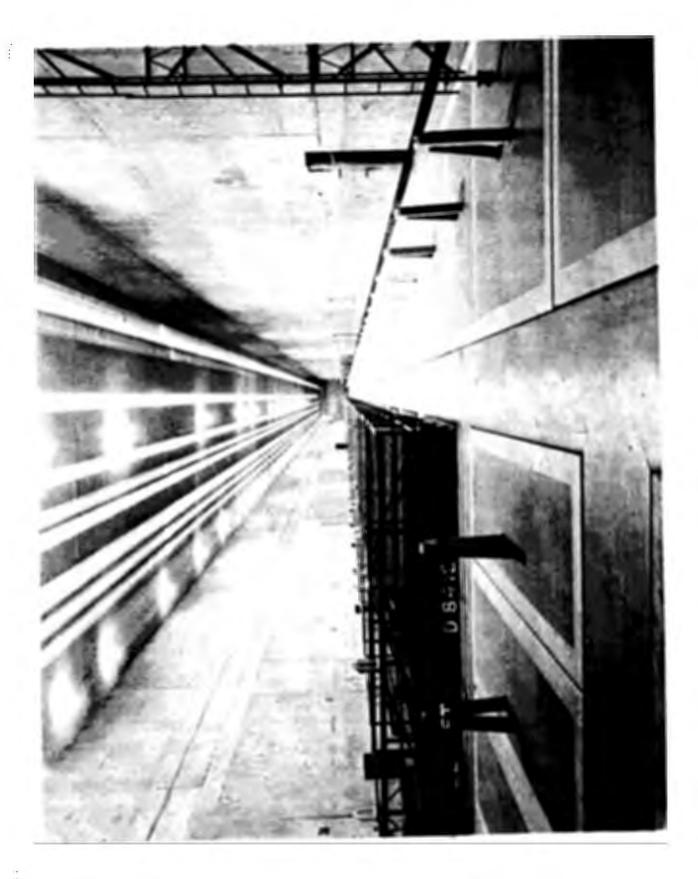
The electrical gallery or besement gallery contains principally electrical lines. The steam main also enters the building through this gallery.



## CELL COVERS (221 EUIIDING)

The cell covers are in removable sections and is the only means of access to the cell. The cover sections have stepped interlocking edges so that there are no straight cracks through which radiation can pass. The light streaks running the length of the building are produced by an overhead crane used in servicing the cells.



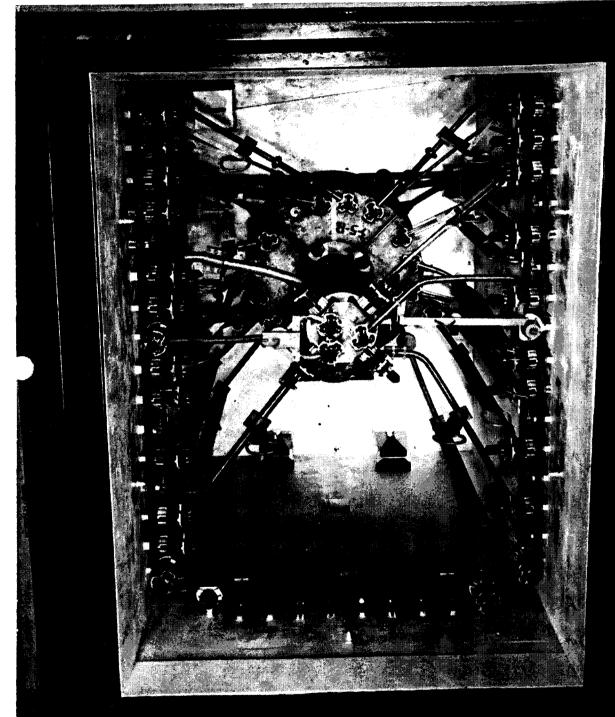




### SEPARATION PLANT DISSOLVER (221 BUILDING)

This is a vertical tank equipped to receive charges of active slugs and conduct operations at the boiling point. There are three dissolvers in 221 Building. The operations of coating removal, metal dissolving and reduction are carried out consecutively in this dissolver.





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NUCLEABANFORMATION



# PARCIPITATOR AND SOLUTION TANK (221 BUILDING)

The precipitator, the upper tank in the photo, is a 9-foot by 9-foot tank. It is equipped with an agitator, a jacket and an overflow line which drains to the cell floor. The solution tank is a small edition of the precipitator equipped with agitator and accessary connections.



NUCLEAR INFORMATION



#### APPENDIK A 88

# CENTRIFUTE AND CATCH TANK (221 BUILDING)

The centrifuge, shown in upper section of the photo, is a 40-inch solid bowl machine with an opening near the bottom of the casing through which the bowl effluent flows into the catch tank. The catch tank is identical to the precipitator in design, but has no agitator. The agitator opening is blanked off with a manhole cover.

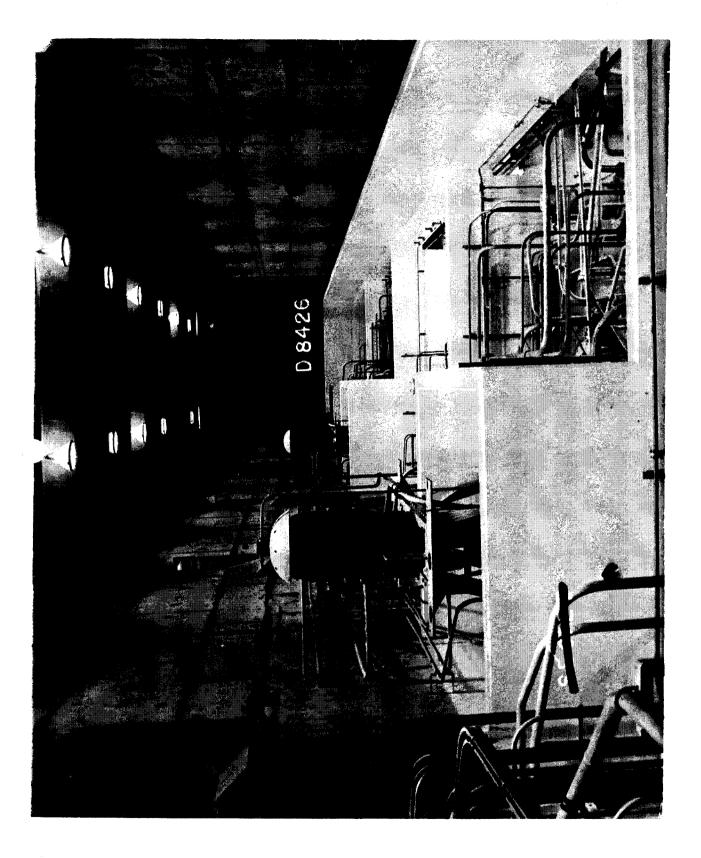


UNCLASSIFIED CONTROLLED NUCLEAR INFORMATION

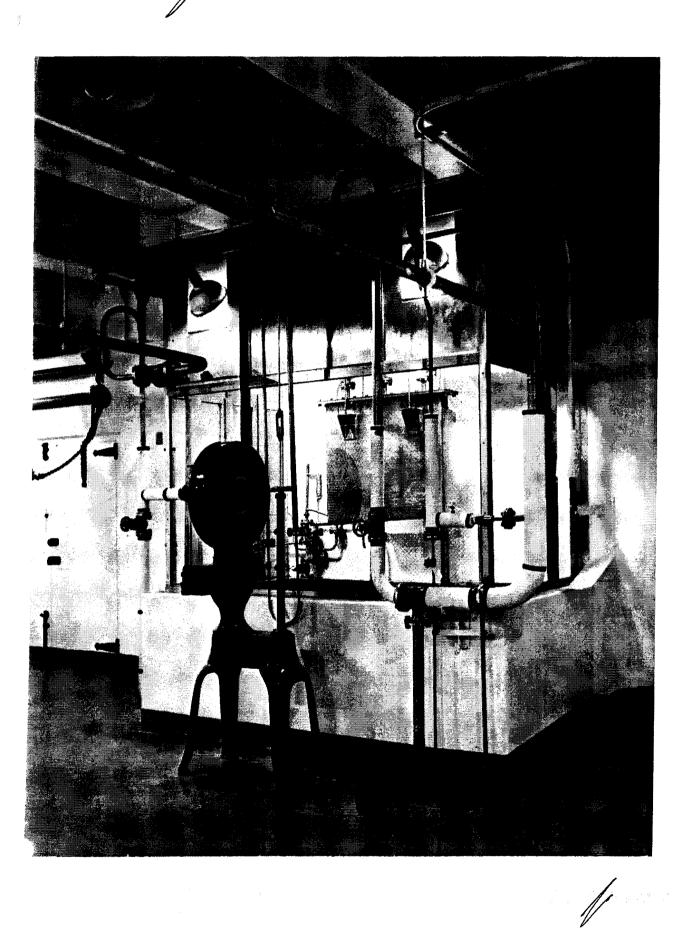
OPERATION CALLERY (224 SUIIDING)



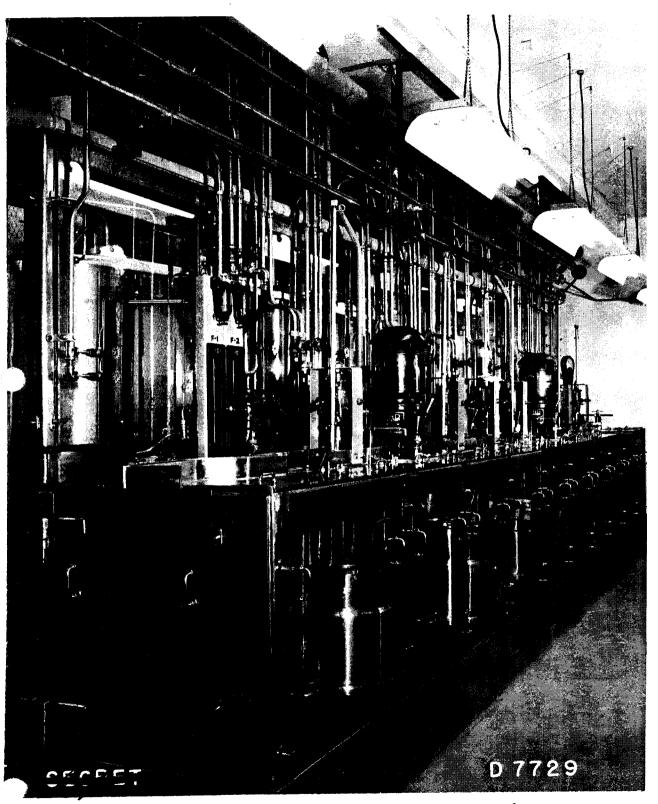
STANDARD CELLS IN 224 BUILDING



FOR COMO. PRIDUCT SOL. (224 BUILDING)



TYPICAL UNIT IN ISOLATION BUILDING



UNCLASSIFIED CONTROLLED NUCLEAR INFORMATION

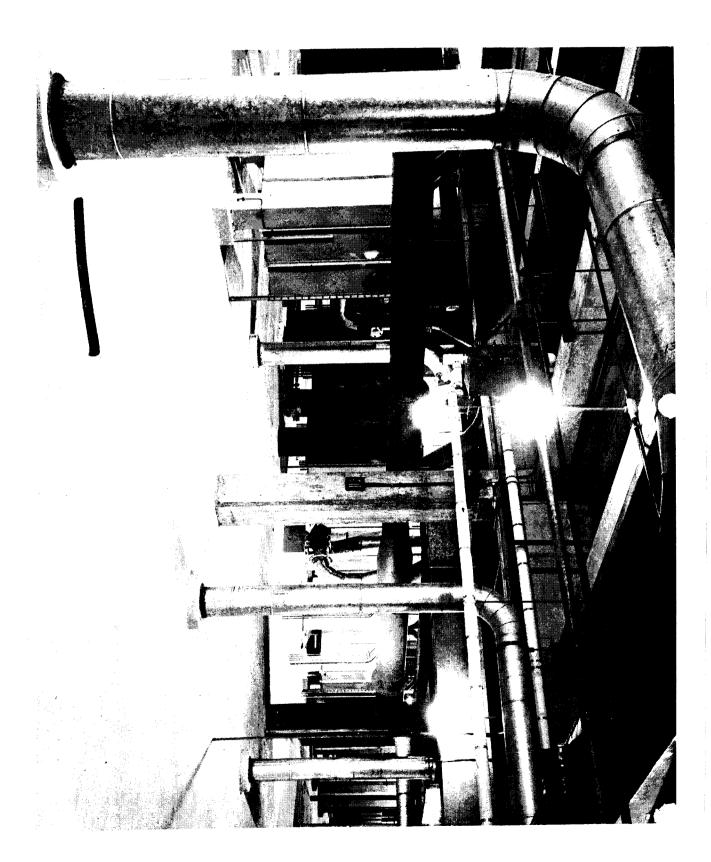


aranoix a 90

TYPICAL LABORATORY (231 V BUILDING)



VENTILATION SYSTEM IN 231 BUILDING

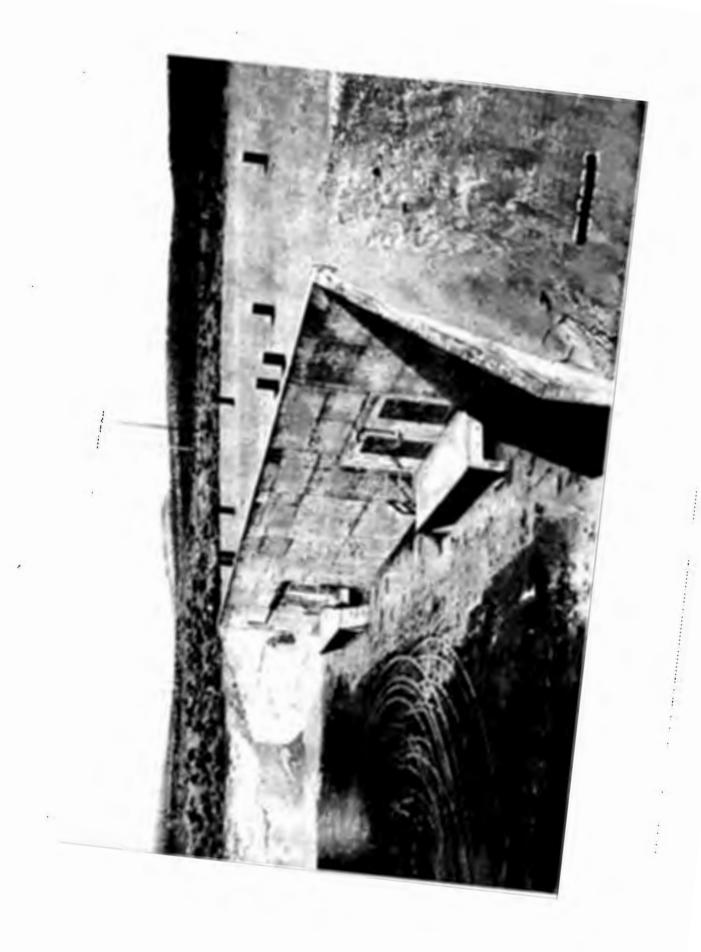




## MAGAZINE STORAGE (213 BUTLDING)

This building contains two parallel vaults in the eastersmost portion of the 200 North Area for the storage of the product.





RYCHIATO YELLAM

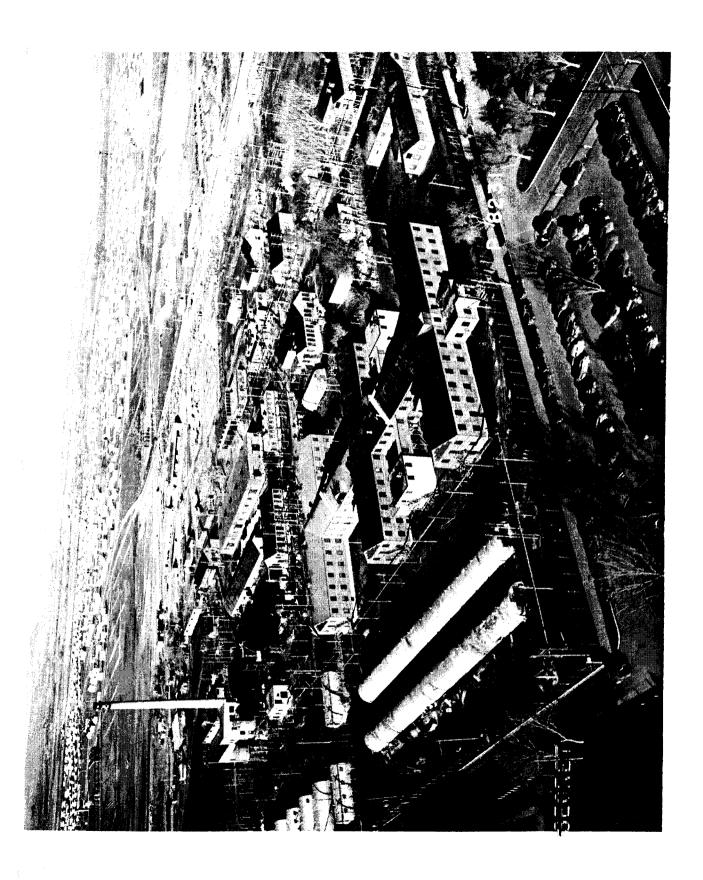
AERIAL VIEW OF RICHLAND VILLAGE (1100 AREA) LOOKING NORTH



## UNCLASSA'IED

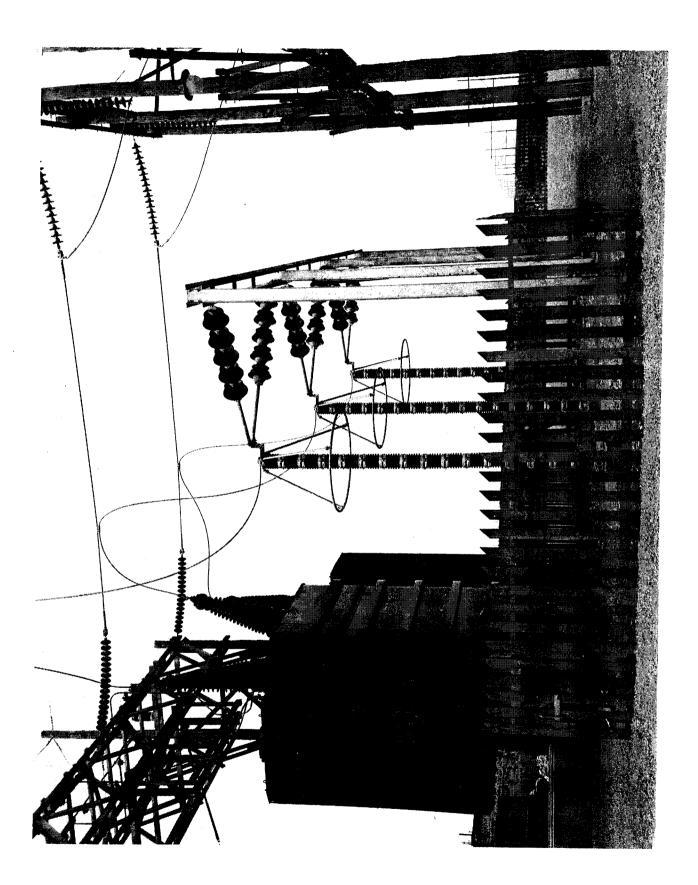
apikadika 97

ALKIAL VIEW OF AUMINISTRATION AREA



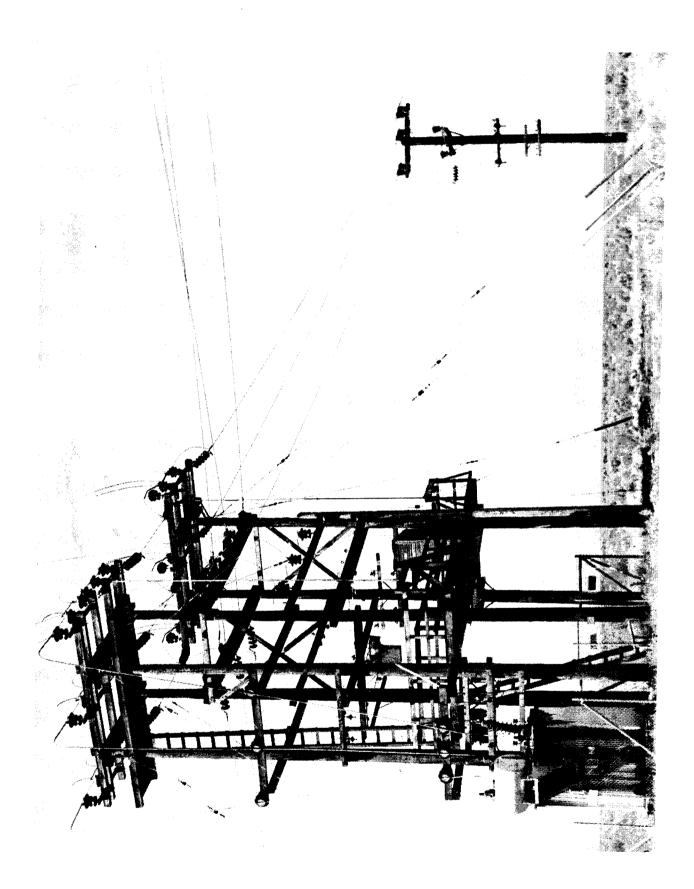
apienoin a 38

SUBSLATION

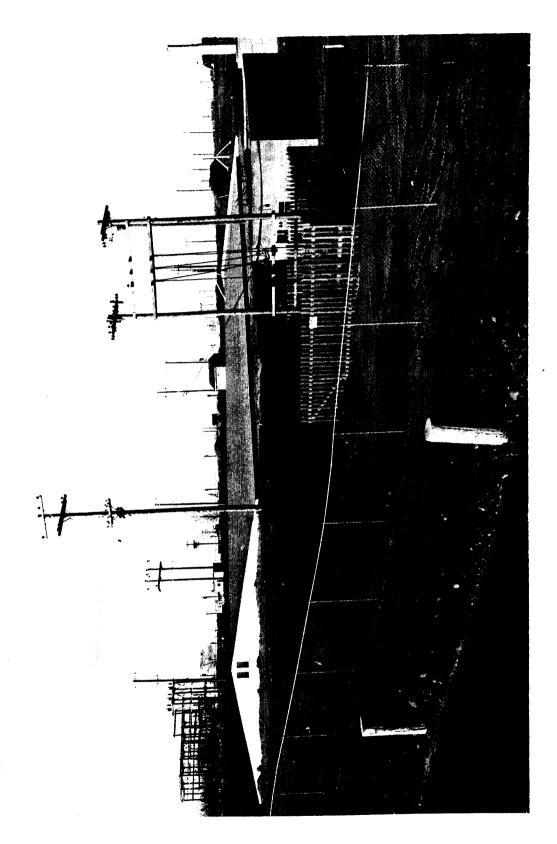


ARRADIX A 99

SUBSTAUTION



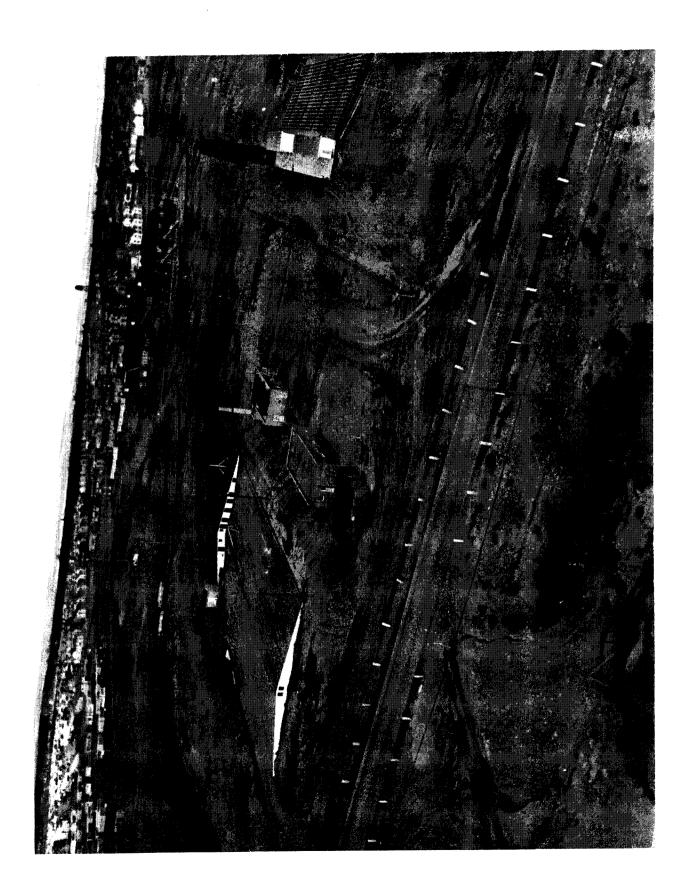
RESERVOIRS AND PURP HOUSE



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APERDIX A 101

RESERVOIRS AND PARP HOUSE



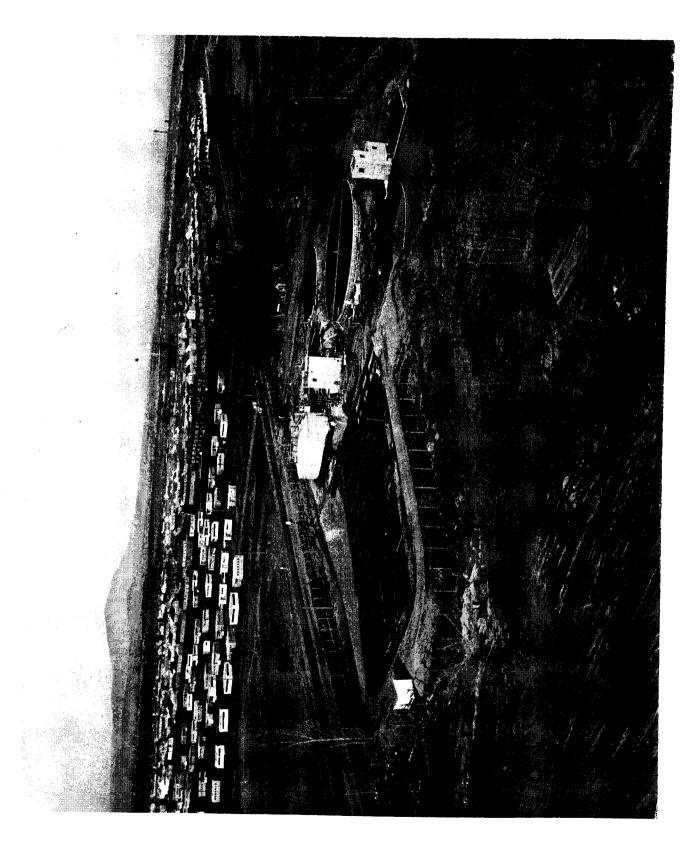
APPENDIX A LOQ

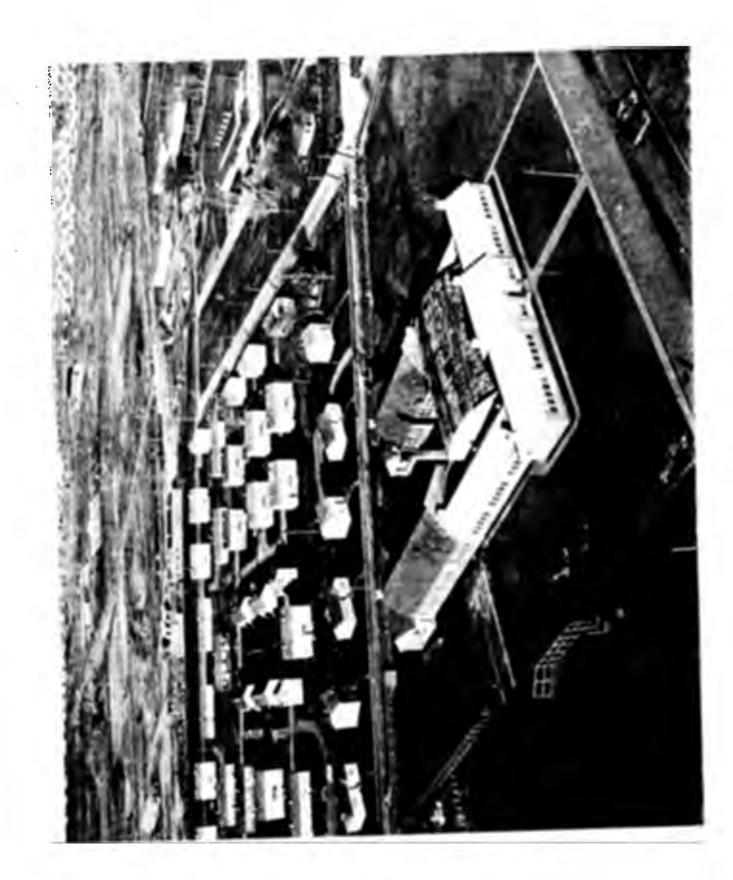
WATER TANK



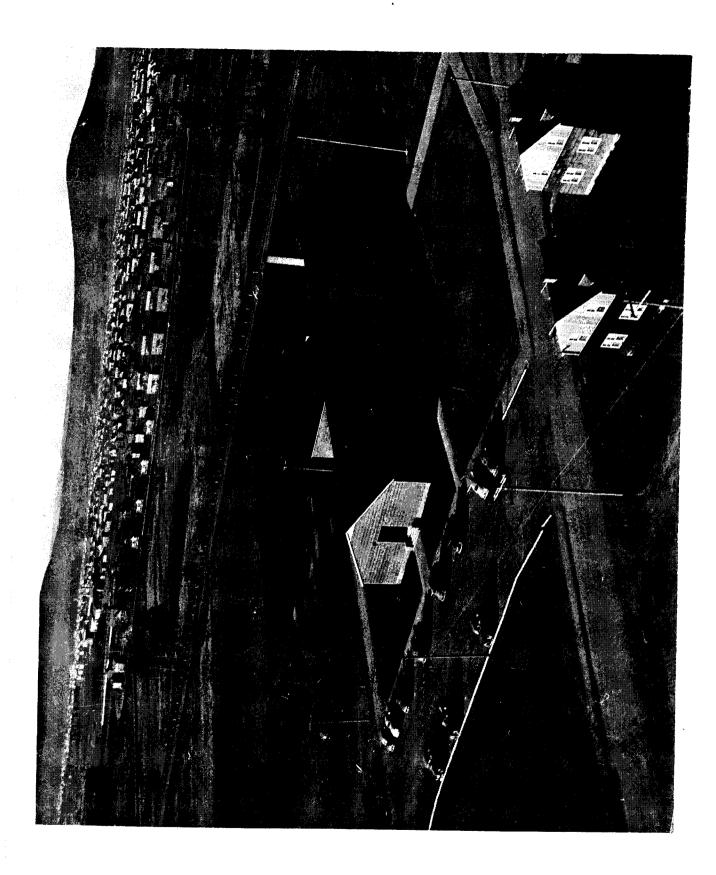
appendix a 103

SENACE DISINGAL MAND



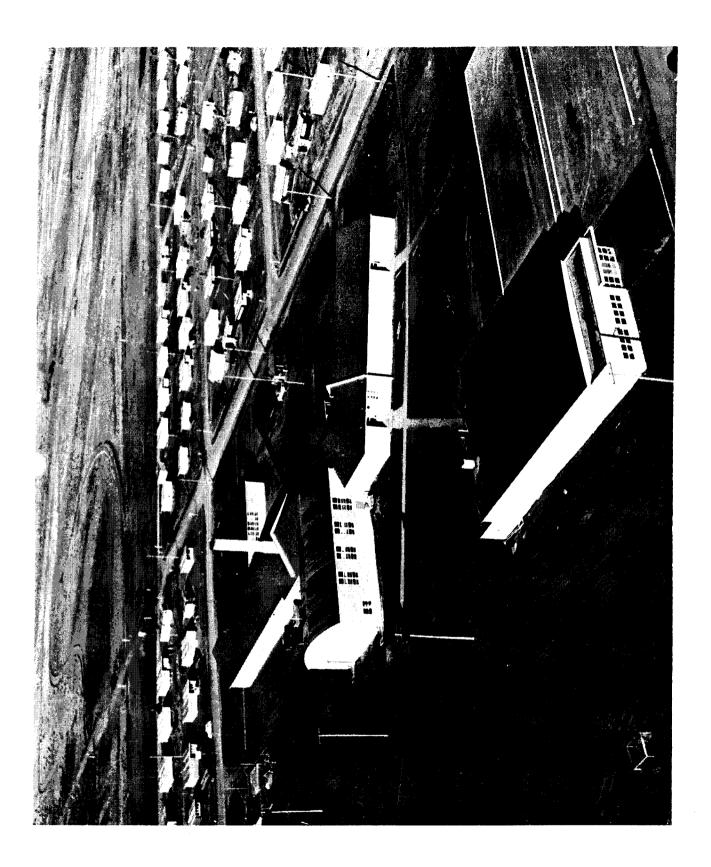


LEWIS AND CLARK GRADE SCHOOL

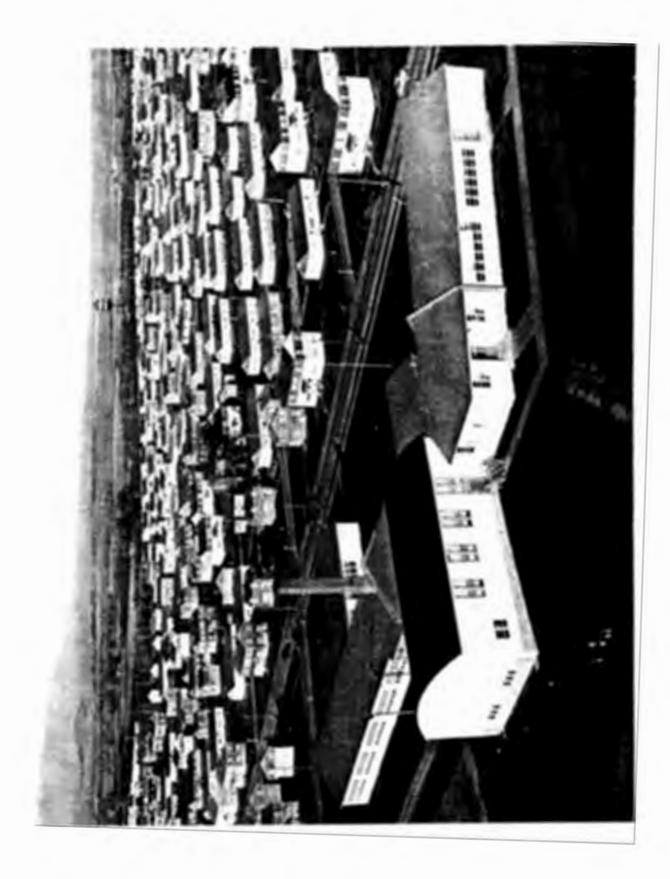


APPRIOR A 109

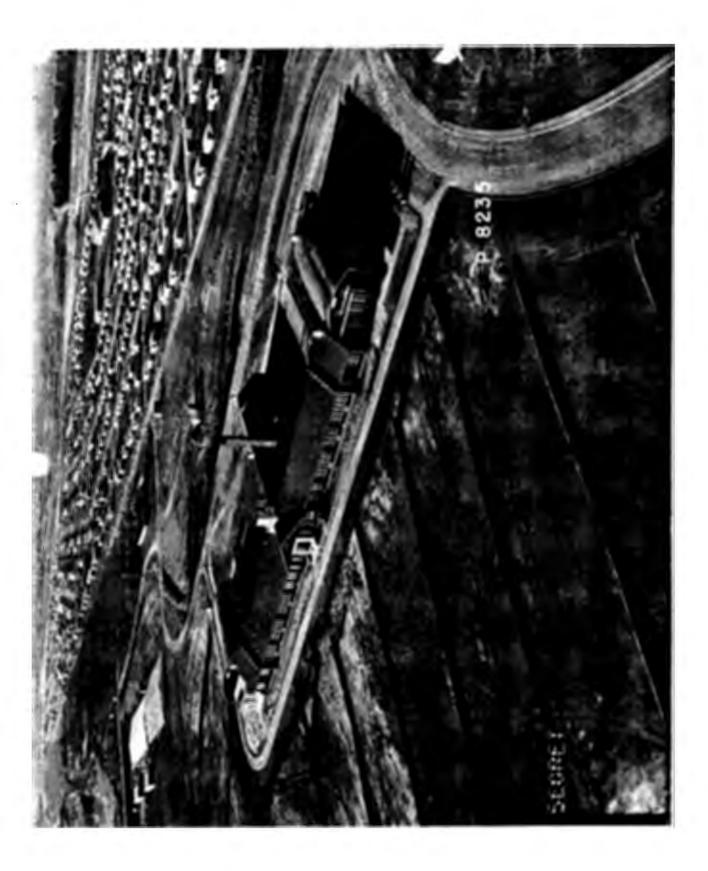
MARCIS WHITMAN GRADE SCHOOL



SACAJAWEA GRADE SCHOOL

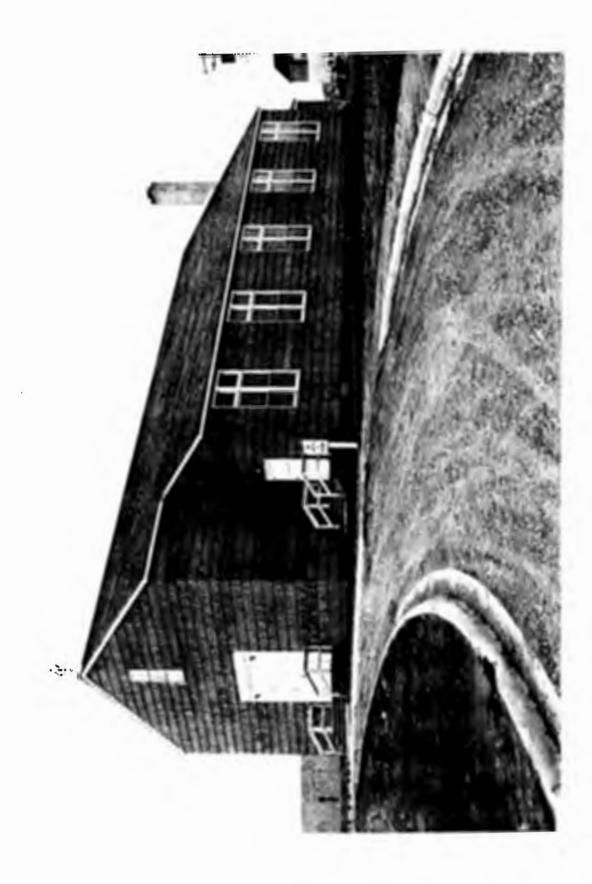


COLUMBIA HIGH SCHOOL



APISIDIX A 112

PROTESTANT CHIRCH

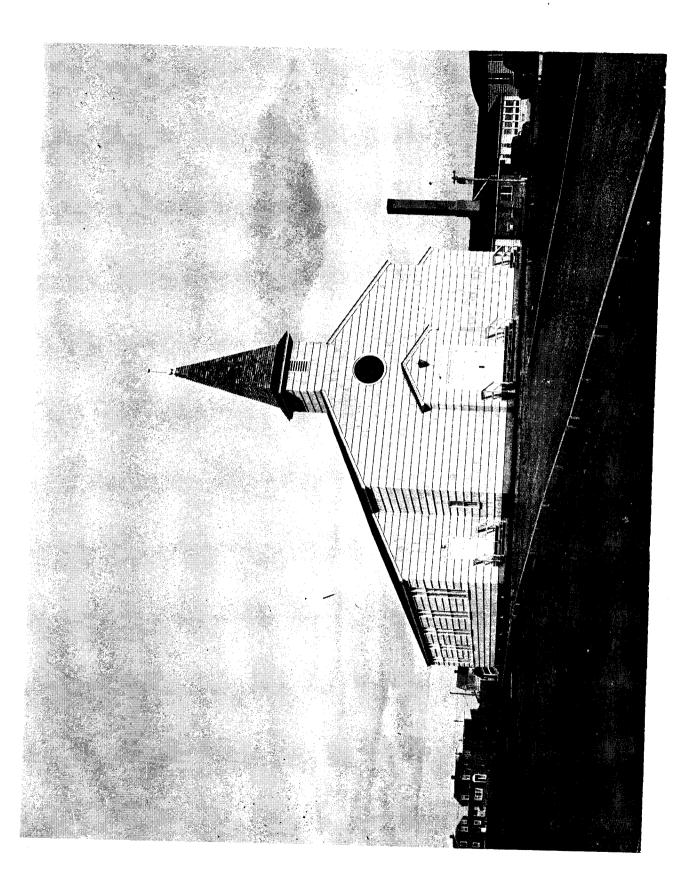


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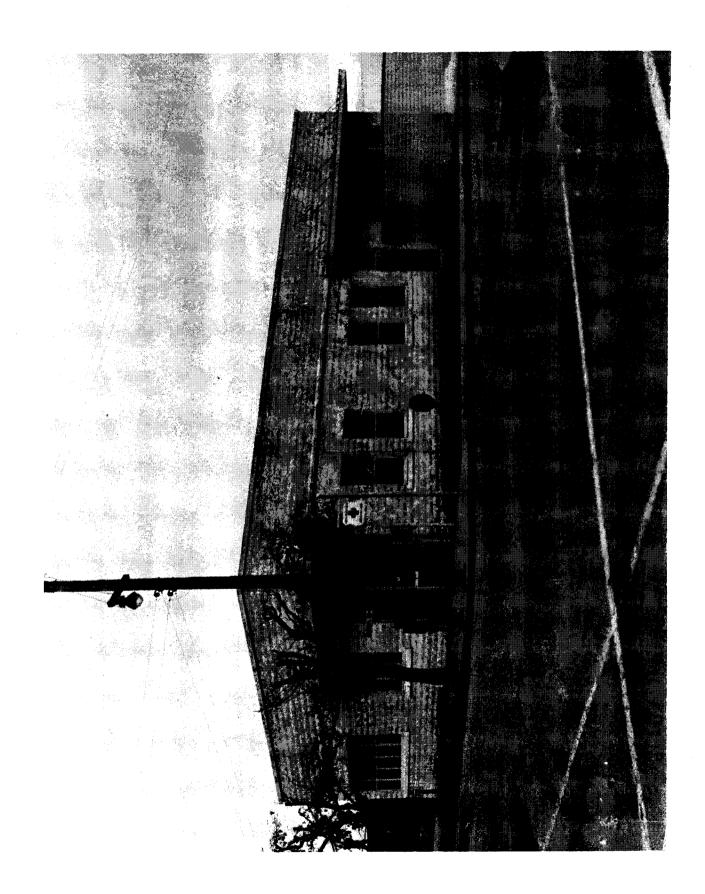
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CATHOLIC CHURCH



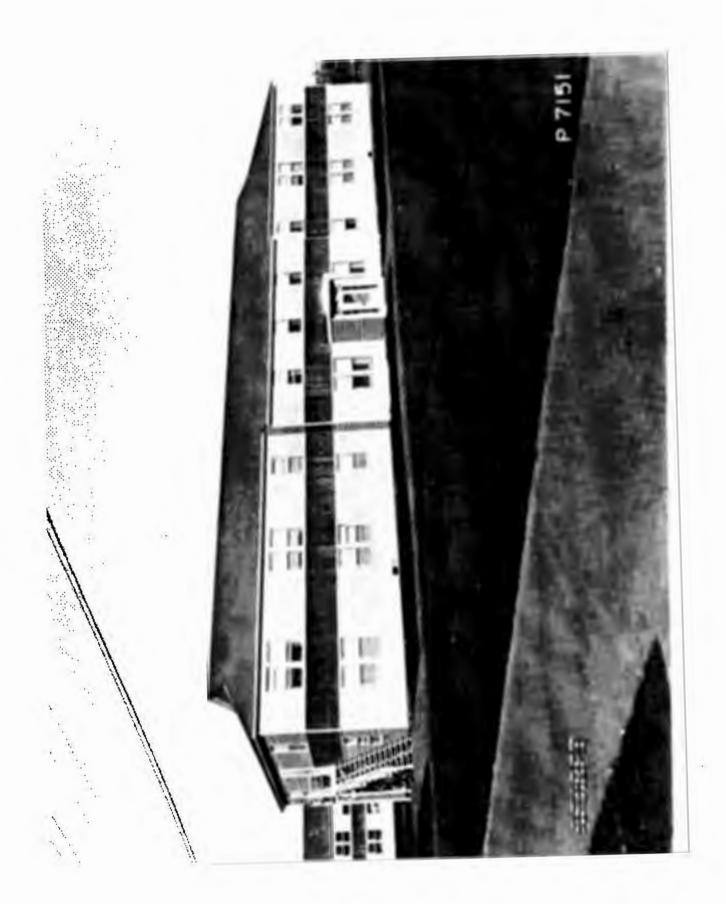
HED CROSS BUILDING



NURSERY



DOMNITORY



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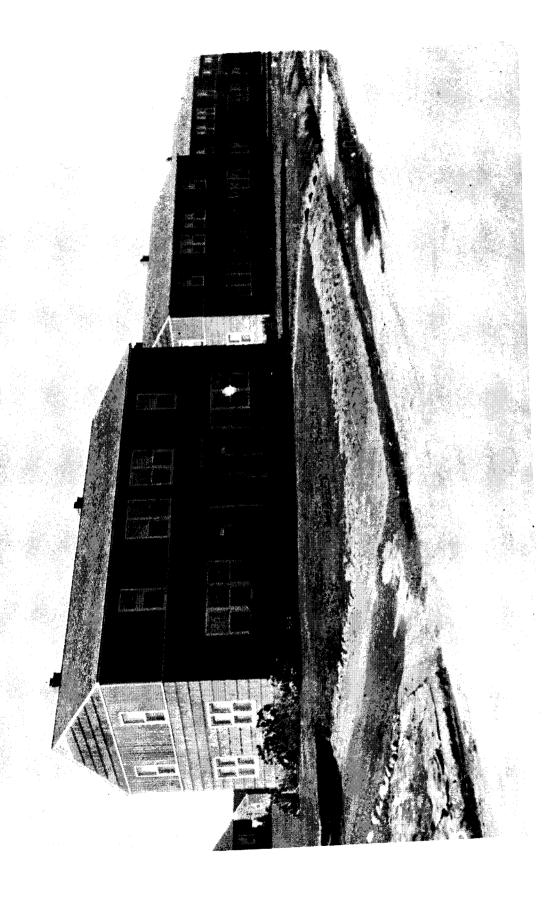
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TRANSLENT QUARTERS

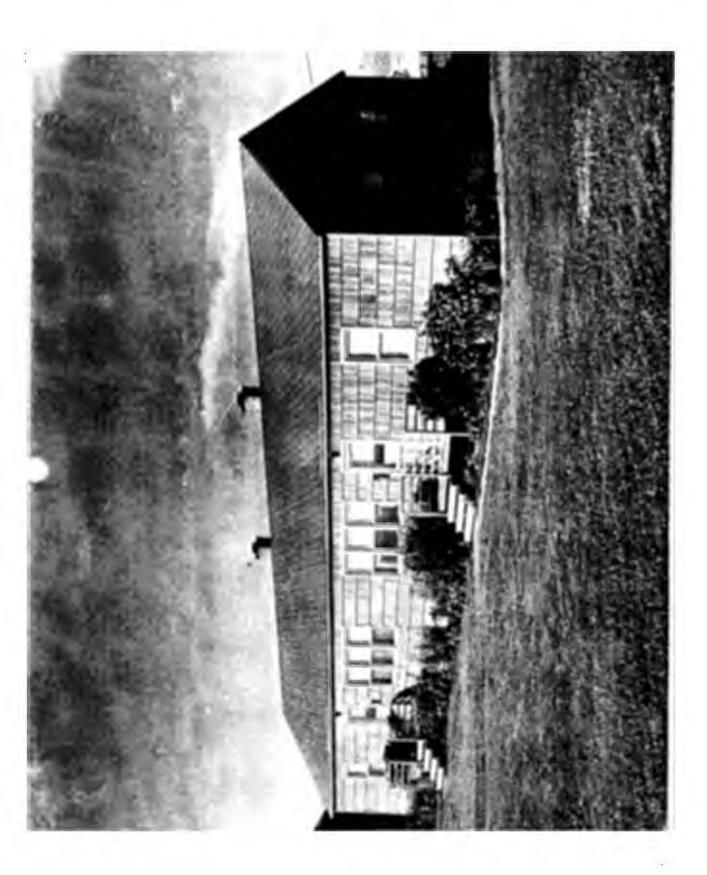


APPLOIX A LLS

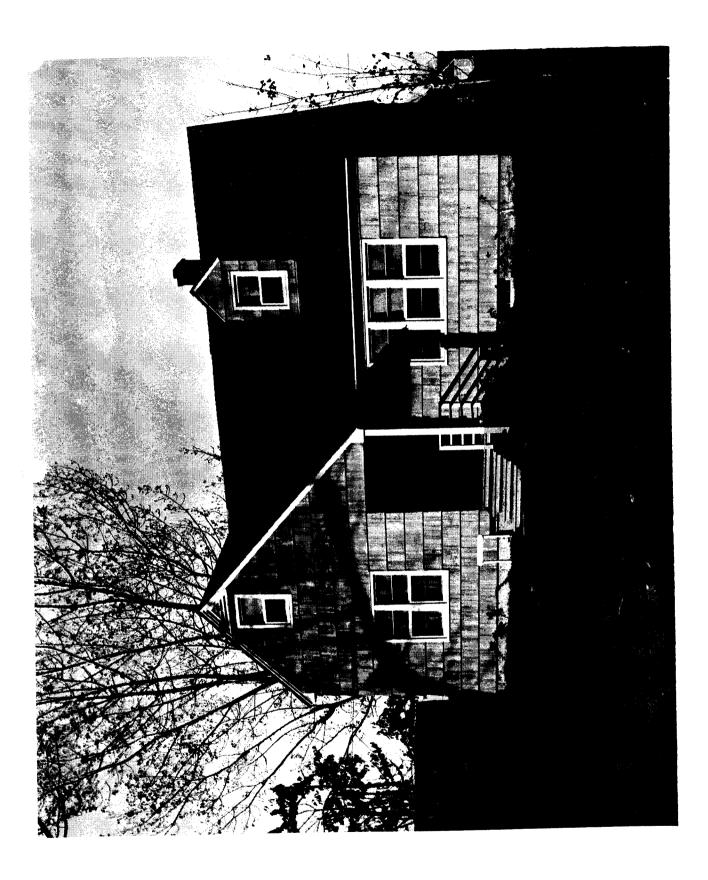
CONVENCIONAL TYPE A HOUSE



CONVENTIONAL TYPE B HOUSE

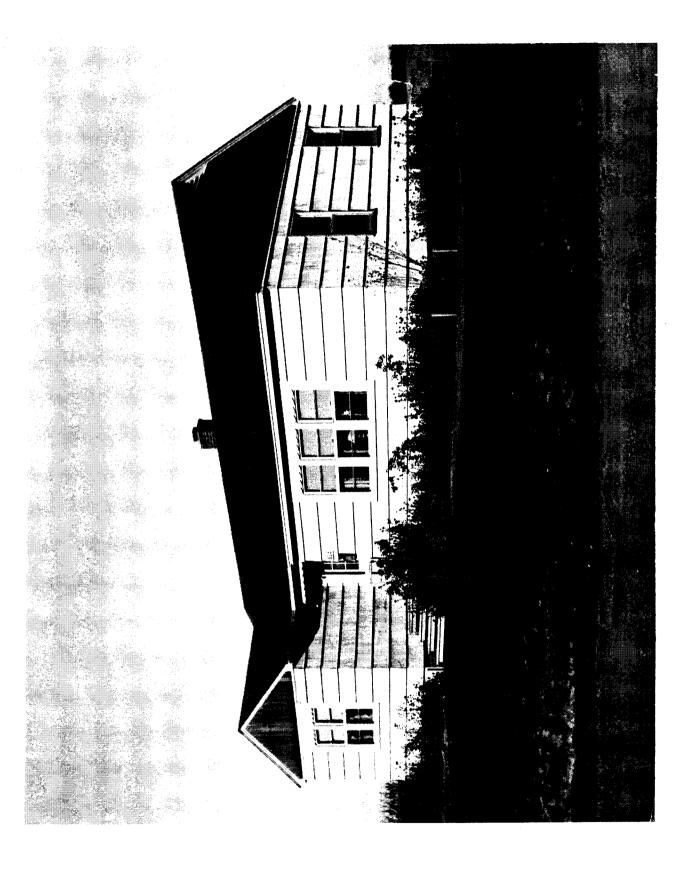


CONVENCIONAL TYPE D HOUSE



APERWIX A 121

CONVENTIONAL TYPE E HOUSE



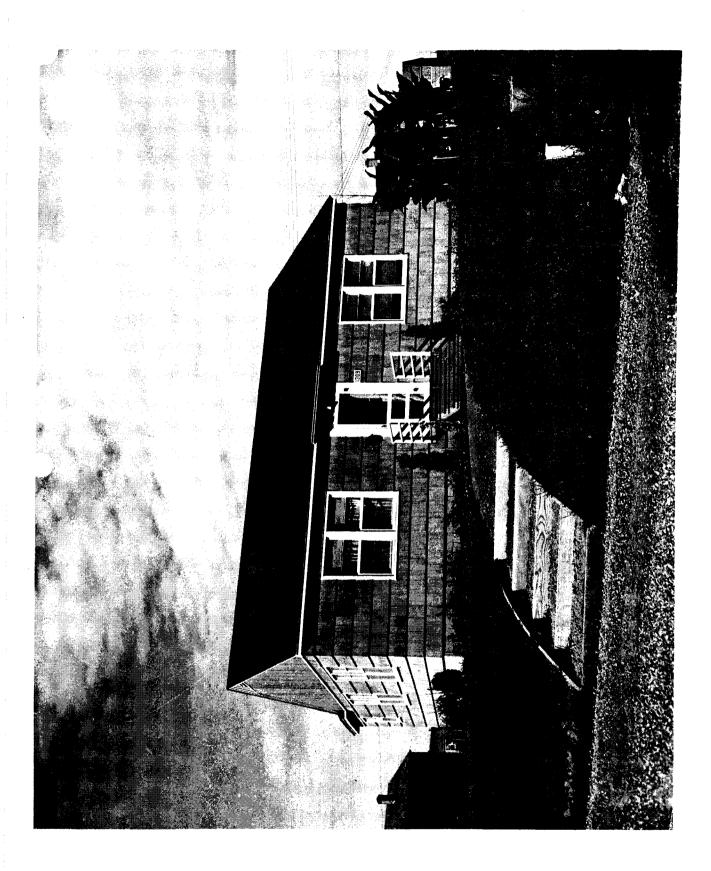
APPRIDIX A 122

CONVENTIONAL TYPE F HOUSE



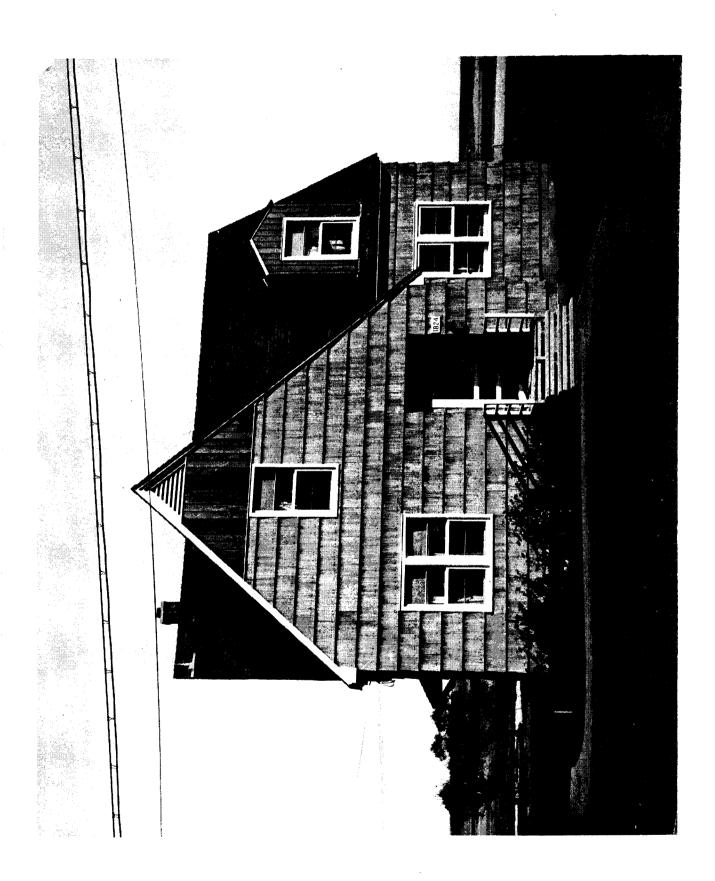
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CONVENTIONAL TYPE H HOUSE

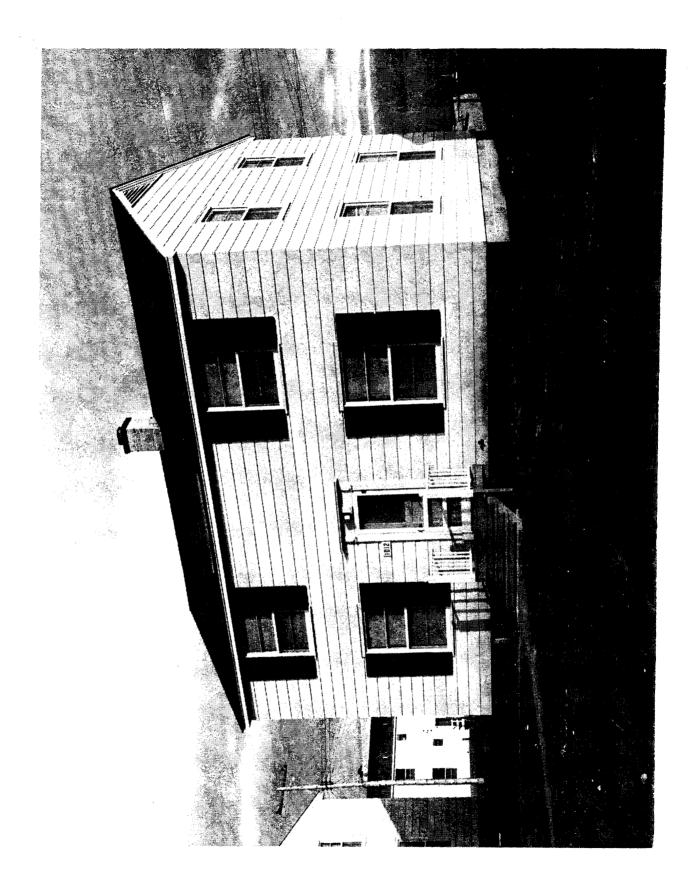


CONVENTIONAL TYPE G HOUSE

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CHIVENTIONAL TYPE I HORSE



## appendix a 126

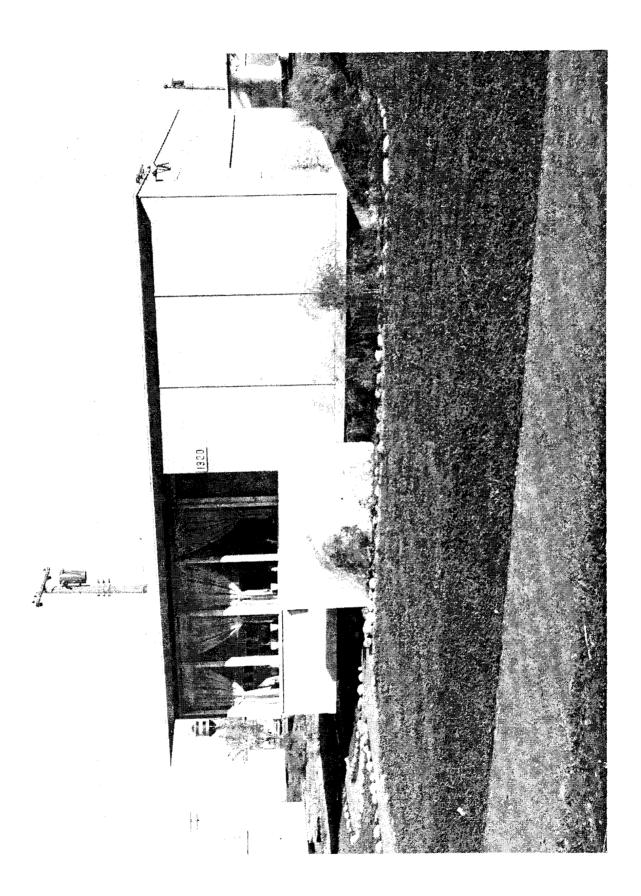
TYPICAL PESPABRICATED-HOUSE STREET



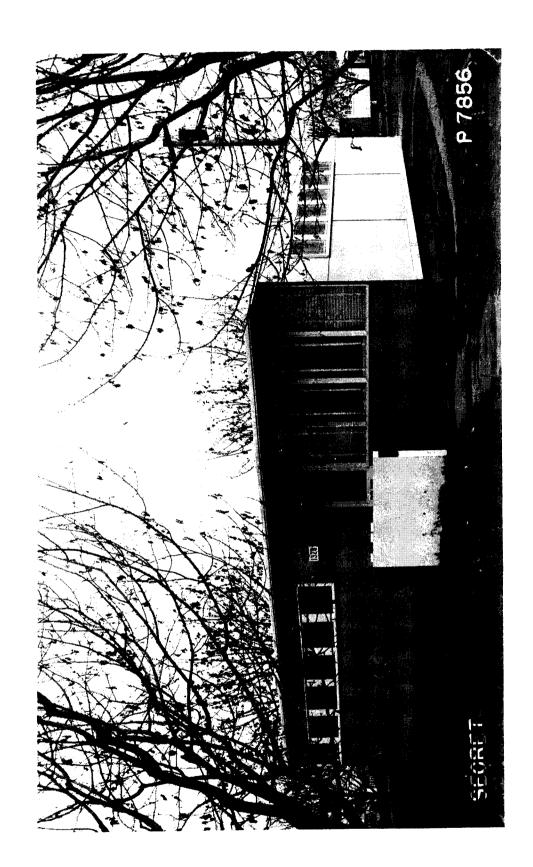
PERSAURICATED TYPE A HOUSE



PREFABRICATED TYPE B HOUSE



PREFABRICATED TYPE C HOUSE



APRIAL VIEW OF COMMERCIAL PACILITIES



apendix a 151

dr**ig** Sign

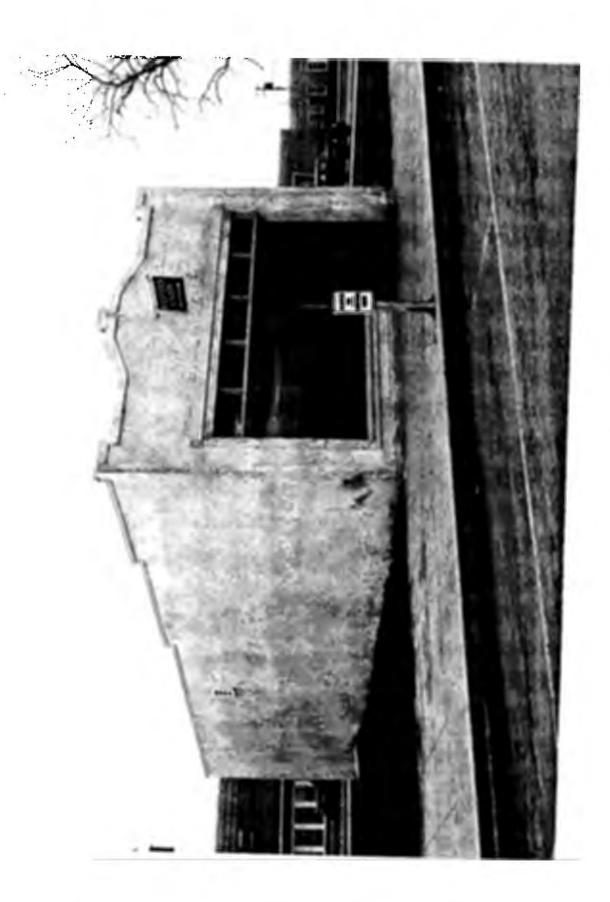


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m . . .

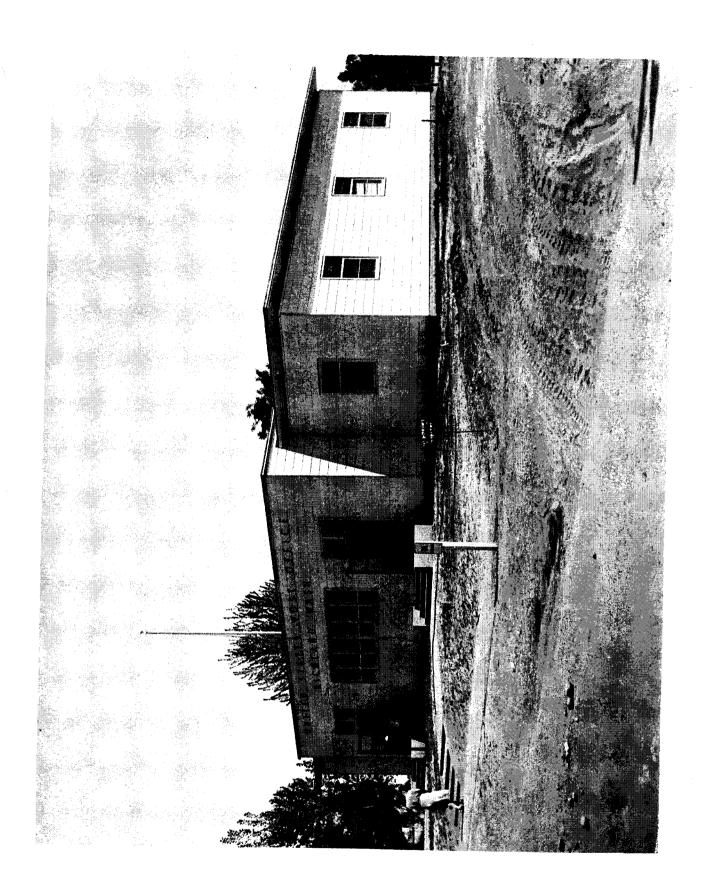
WESTERN UNION BUILDING



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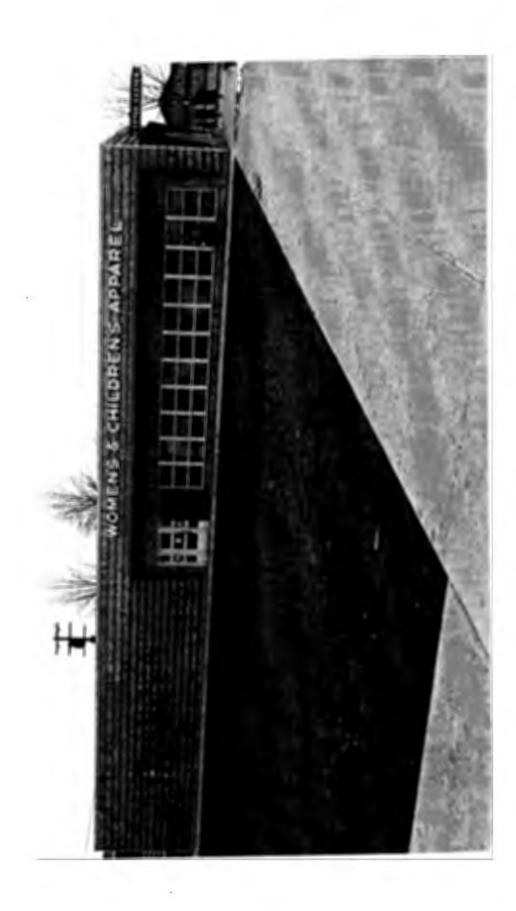
4

POST OFFICE



APERDIX A 174

WOMEN'S APPAREL SHOP



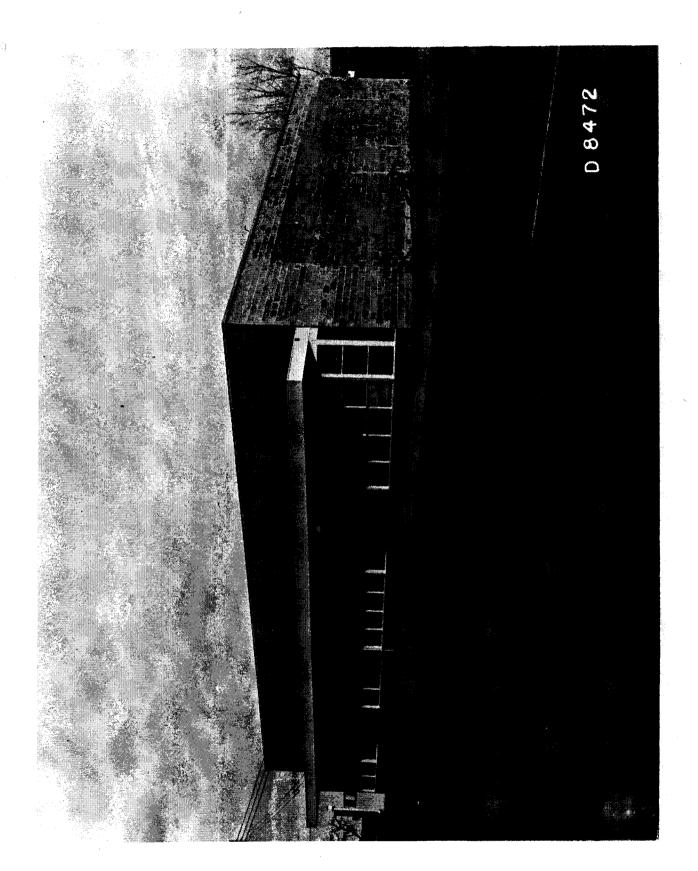
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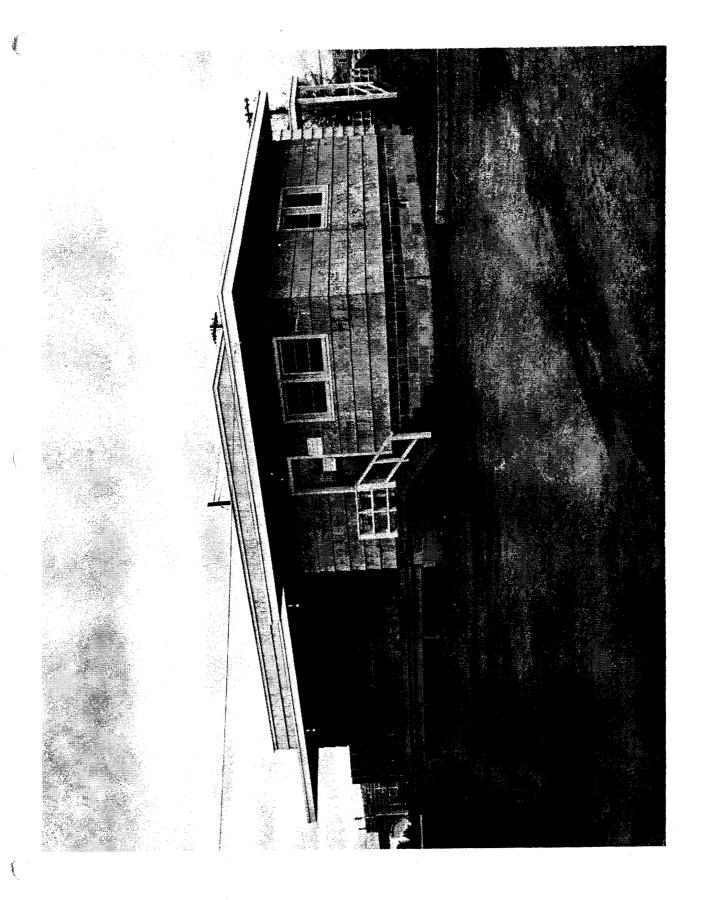
OPTICAL SHOP



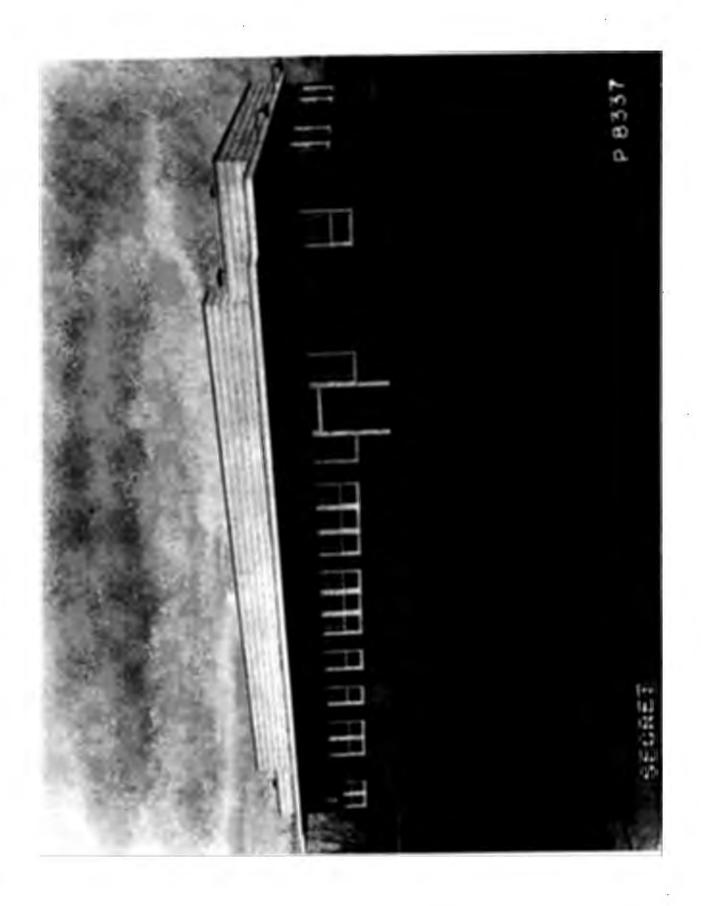
APPENDIX A 136
MEN'S APPAREL SHOP



MILK DEPOR

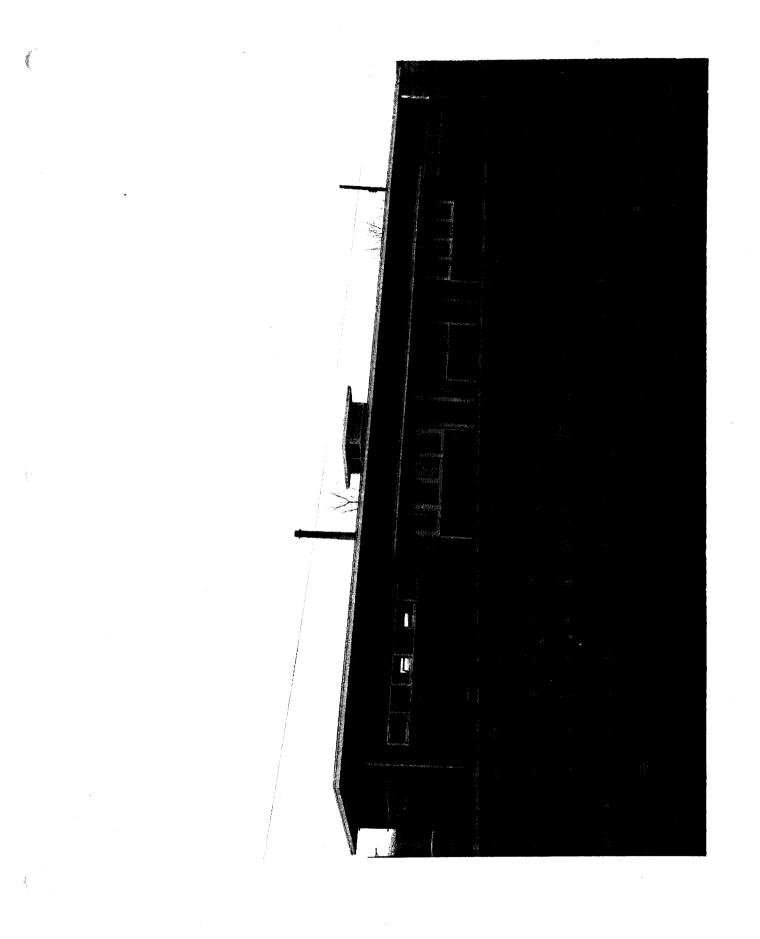


BUS DEPOT

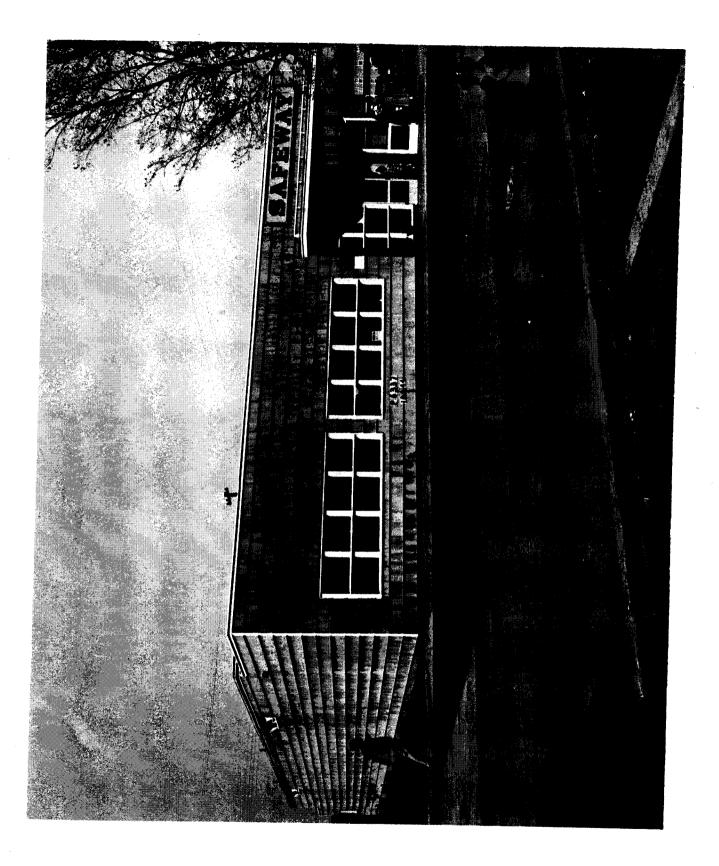


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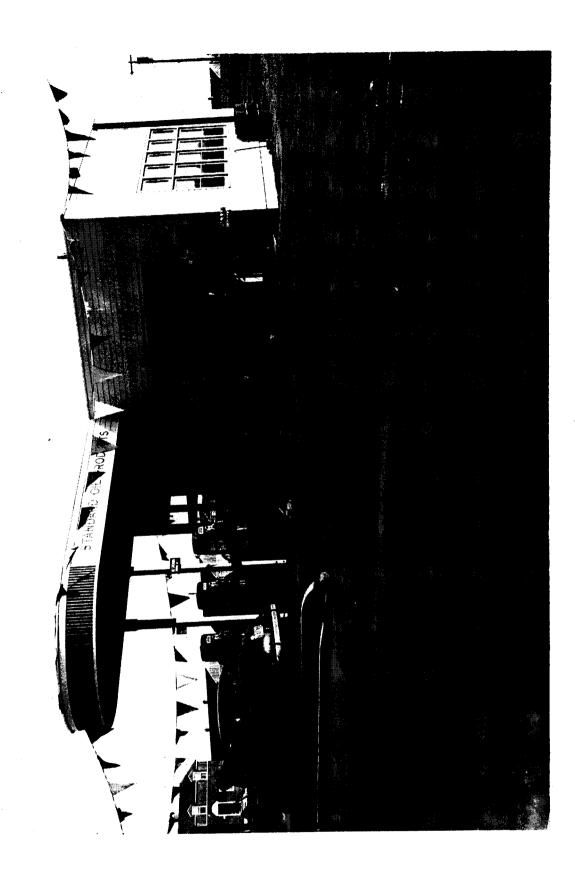
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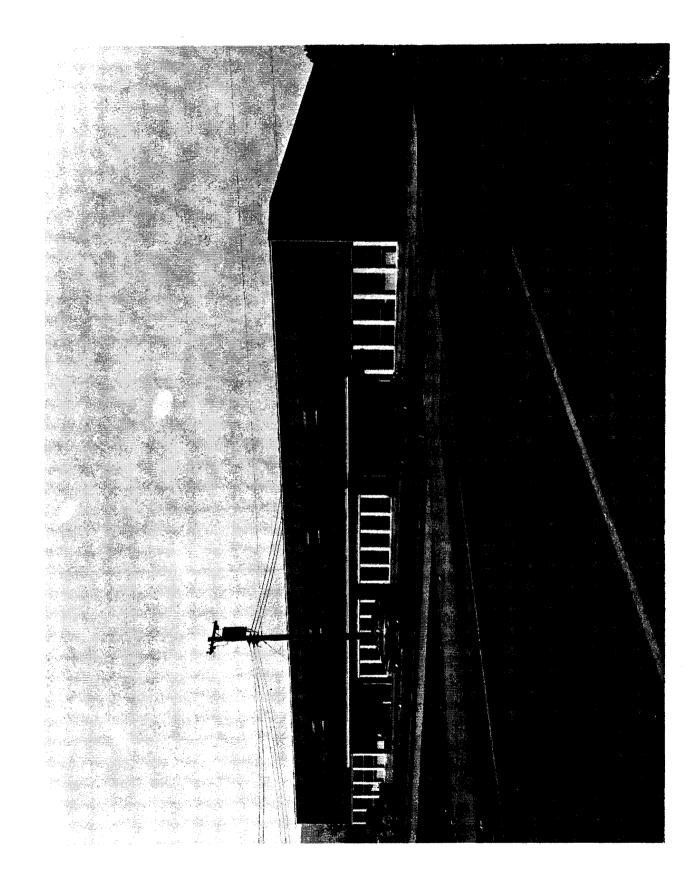
FOOD STORE



SERVICE STATION



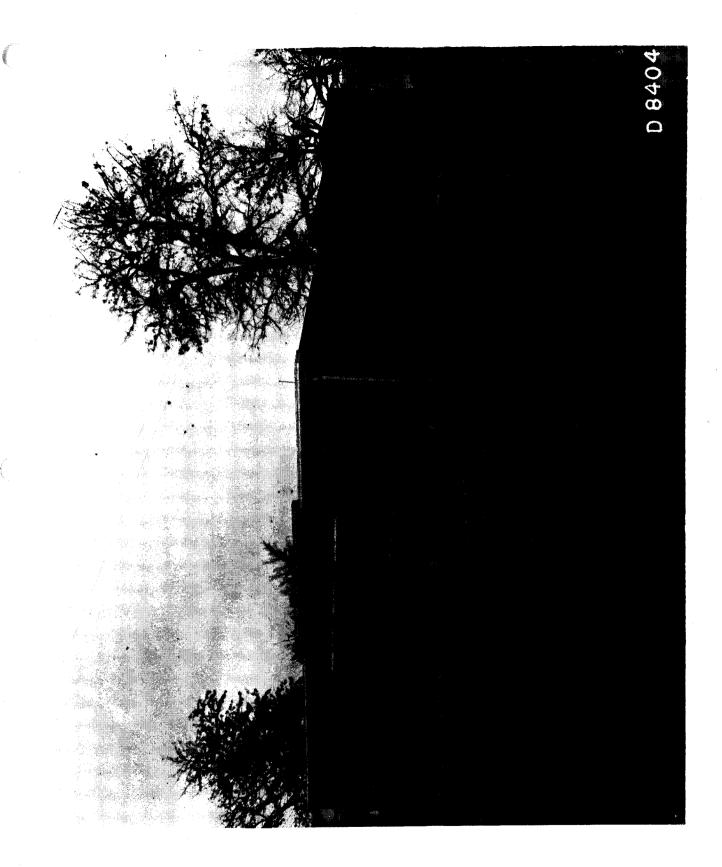
DEPARTMENT STORE



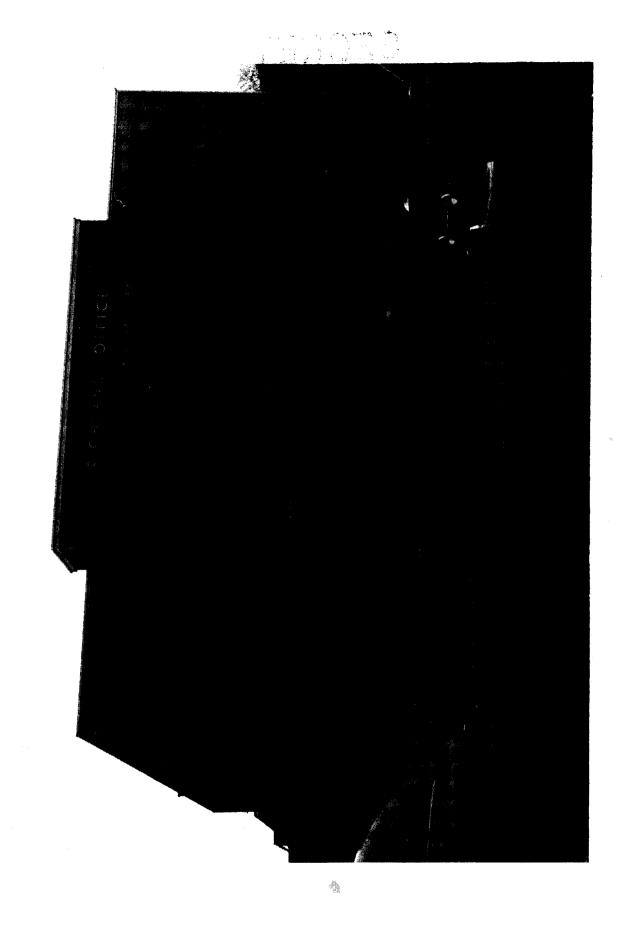
CAPETERIA



HARDWARE STORE



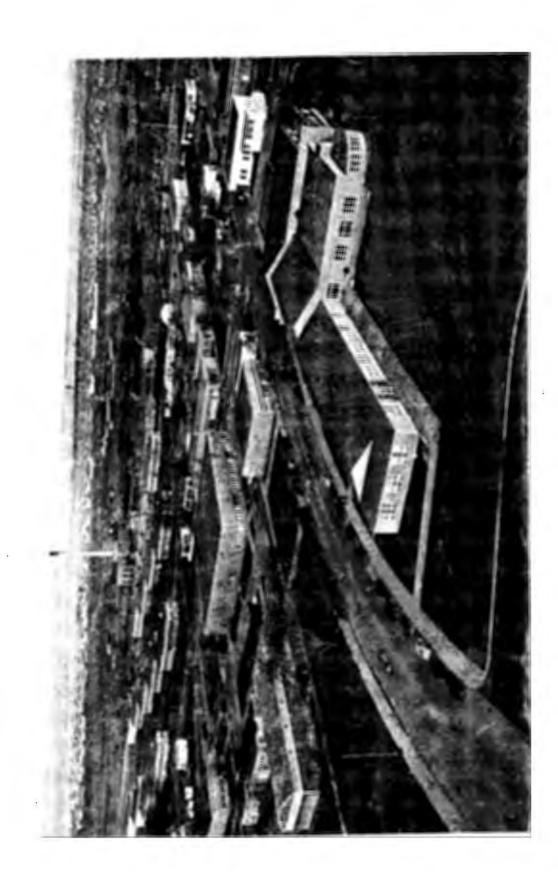
BANK



SINGURICAL SHOP



REGREATION BUILDING



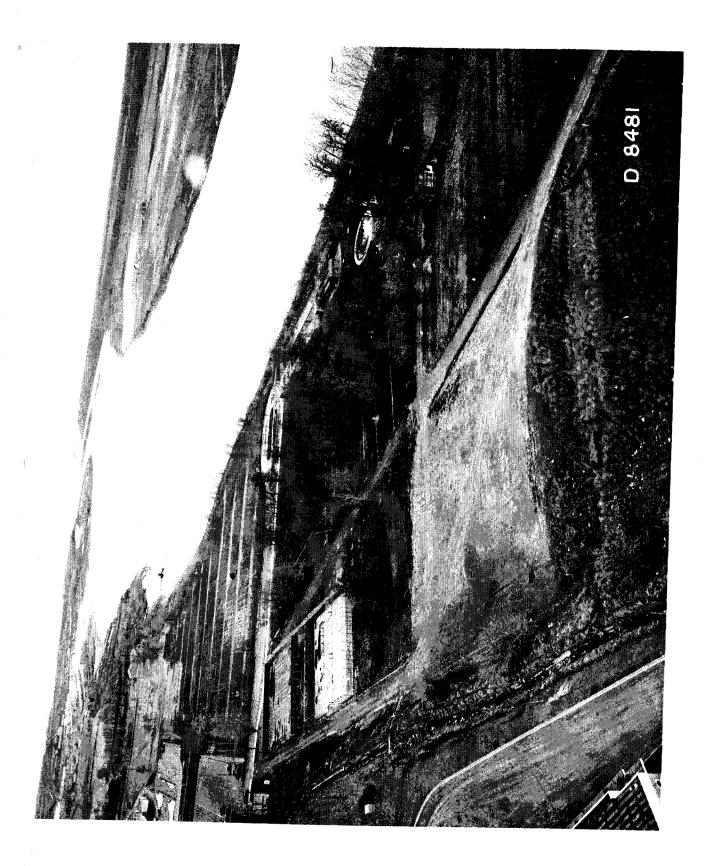
AFPENDIX A 148

THEATER



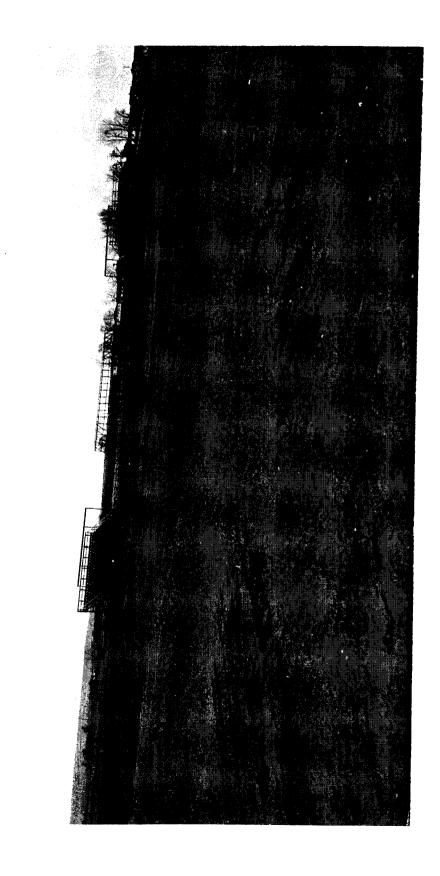
APPRIDIX A 149

TYPICAL BASEBALL FIELD



AFPENDIX A 150

HIGH SCHOOL FOOTBALL PIELD



RICHIAND VILIAGE PARK

